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Pennsylvania Caves

By

RALPH W. STONE

Department of Internal Affairs
James F. Woodward, *Secretary*

Topographic and Geologic Survey
Geo. H. Ashley, *State Geologist*

HARRISBURG, PA.
1930

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LETTER OF TRANSMITTAL

Harrisburg, May 14, 1930.

Honorable James F. Woodward,
Secretary of Internal Affairs.

Sir:

I have the honor to submit herewith a brief paper by Mr. R. W. Stone, describing the better known caves of Pennsylvania.

During the last few years a very large interest has developed in caves, due in part to their becoming accessible through good roads, and in part to the fact that many caves have been prepared for visitors, are lighted and well advertised.

This interest has led to many inquiries, as to the location, size and character of the caves of Pennsylvania, and the accommodations at them. Their existence and accessibility add one more to the many attractions of Pennsylvania for the tourists and for our own people.

Because of their location under the surface, their labyrinth-like passages, and the beautiful rock formations to be found in most of the caves, they will always be a source of interest, as there are not two alike. They can be seen at night as well as in the day time, and some tourists lengthen the day's sight-seeing by adding a tour through a cave in the evening.

Respectfully submitted,

Geo. H. Ashley

State Geologist.

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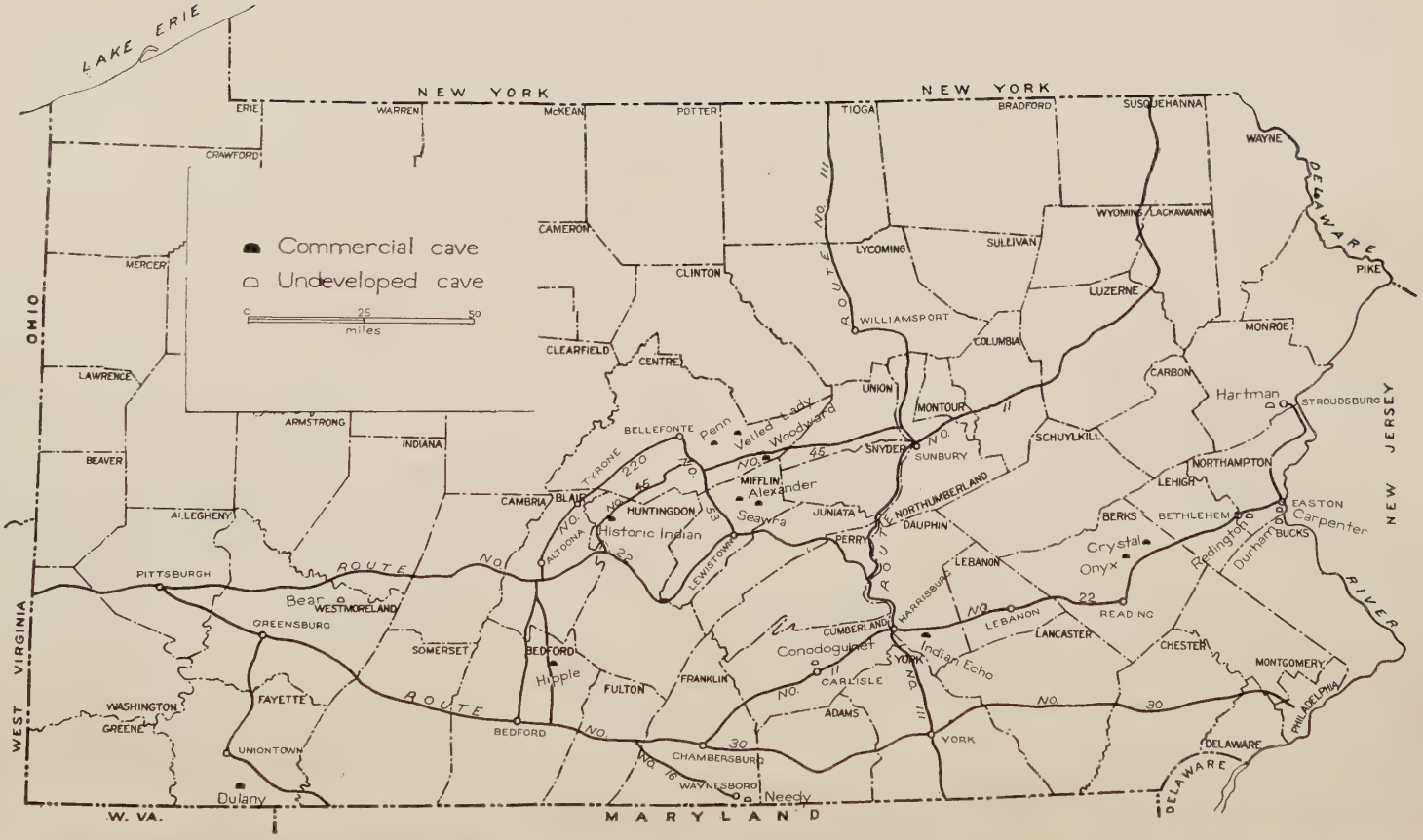


1. Map of Pennsylvania showing location of principal caves

PENNSYLVANIA CAVES

By R. W. Stone

INTRODUCTION

Why so many people go to New Hampshire for scenery and to Virginia to see caves is simply because Pennsylvania's own attractions have not been advertised enough to make our people conscious of them. The printed word is not so effective as the word passed on by a friend or acquaintance, but it seems that now is the time to gain for Pennsylvania scenery the friends who will tell the mass of the traveling public what we have within our own boundaries.

The improvement of our highways has followed or been contemporaneous with the increased use of the automobile, and the combination has taken our people here and there over the State until many of them know the beauty of the scenery, the wooded hills, the rocky glens, fertile fields, and lush pastures; they know the good roads, the State Forest public camps, the better eating places, and the way to Gettysburg; but all too few know anything of our geologic features and rock formation that have deep interest for old and young. Of caves, for instance, we need to do some advertising; one cave has been open to paying visitors since 1873 and another since 1885, but several others are new, opened since the World War or since 1928. It is these new-comers in the field that should be called to the attention of the public. The people who want to see caves now go in thousands to Virginia to satisfy that desire, when if they only knew it, they could spend their cave money in their own State.

This booklet is designed to acquaint the traveling public and the stay-at-homes with the things to be seen in our environs.

Many people know of Crystal Cave near Kutztown in Berks County because its sign boards have pointed the way for several decades, but few people realize that there are 10 other caves in Pennsylvania open for business. Preparation of a cave for showing it to tourists includes first the cleaning out of clay and other material, and then the installation of electric lights, building paths that will be dry and clean, with stairs and handrails where desirable, and closing the entrance so that admission to the cave can be controlled. Nine caves in this State are so prepared. One is traversed only by boat and is illuminated by a searchlight carried on the boat. One is shown by carbide lamps worn on the hat or carried in the hand of the guide.

Four of these caves are in the eastern part of the State in Northampton, Berks and Dauphin counties in the Cambro-Ordovician limestone;

the rest are in the central part of the State in Mifflin, Centre, and Bedford Counties in limestones of the same age, except one, which is in Helderberg limestone.

The developed caves are described first in the following pages, and then come notes on twenty caves that have not yet been commercialized.

Patronage of the caves is largely in the summer or tourist season, and especially on Sundays and holidays. Therefore, if one wishes to avoid a crowd, avoid caves on holidays. Admissions range from 50 cents to $1.50 per adult. The charge for children is less.

All of the caves are kept clean and the floors are dry. They vary in temperature, some being cooler than others. In size they range in distance from front to back, from about 250 feet to 2,000 feet, counting only the passages in which visitors are regularly taken. Ceilings also are variable, ranging in height from floor level to 89 feet. Open spaces likewise, as shown by the maps, range from chambers 100 feet wide to mere passages in which two people cannot pass.

As to which is the largest cave in Pennsylvania, that depends. Some caves are long with narrow passages, and small volume; some are short with wide passages and great volume. In some commercial caves all known passages are developed; in others, only part of the known caverns are shown to visitors. In some caves the distance traversed by visitors is not more than the length of two short city blocks, in others just under half a mile. Usually some of the route is retraced, if not all of it, on the return to the entrance.

The following table gives the length of the caves from entrance to back wall in a straight line, and the distance traveled by visitors underground.

SIZE OF CAVES, IN FEET

Name of cave	*Length*	*Route traversed*
Alexander	2,000	4,000
Crystal	360	800
Hipple	1,100	2,200
Historic Indian	600	1,100
Indian Echo	400	1,300
Onyx	250	600
Penn	1,200	2,400
Seawra	600	1,250
Veiled Lady	300	600
Woodward	450	1,200

Most of the caves here described have been seen by the writer since September, 1929. The description of four caves, Hartman, Carpenter, Redington, and Durham, is by E. R. Barnsley of the State Geological

Survey. M. N. Shaffner also of the Survey made all the drawings reproduced in this report, and assisted materially in the field work.

The following list gives the names and addresses of the owners of commercial caves in Pennsylvania.

Cave	*Owner*	*Address*
Alexander	The Alexander Caverns, L. L. Weaver,	Naginey
Crystal	Crystal Cave Company, Inc., J. Douglas Kaufman, President,	Berks County Trust Building, Reading
Hipple	H. S. Stonerook,	Waterside, Bedford County
Historic Indian	Harold A. Wertz,	Franklinville
Indian Echo	Indian Echo Cave, Inc., John H. Bieber, Sec.	Hummelstown
Lost	E. C. Gilman,	Hellertown
Onyx	A. S. Hunsicker, R. D. 2,	Hamburg
Penn	R. P. Campbell,	Centre Hall
Seawra	W. P. Searer, Sect'y, Seawra Cave,	Lewistown
Veiled Lady	G. Edward Haupt,	Bellefonte
Woodward	Woodward Cave Co., Inc.,	Woodward, Centre County

The writer is indebted to all of these owners for cooperation, assistance, and courtesies, including admission to their caves, help in making maps, and photographs.

COMMERCIAL CAVES

ALEXANDER CAVERNS

Alexander Caverns is the name of wonderfully fine underground water courses situated in Mifflin County, about 9 miles north of Lewistown, and 3½ miles from Reedsville. The plural name is used because one part of the cave, a former water course, is now perfectly dry, and another part is a sizable stream. The dry cave is traversed on foot and the wet cave is accessible only by boat.

Alexander Caverns has no Indian and brigand history and no legend connected with it because the dry cave was not discovered until 1926, and since then it has been a purely business proposition. The early settlers in this region discovered a huge spring issuing from a large hole in a limestone cliff along Honey Creek and called it Mammoth Spring. The hole was large enough for cattle to enter, and it opens shortly into a spacious cavern. Presumably men explored the entrance by wading up the stream, and it is said that a small row boat or raft was used for the more remote passage where the stream is deeper. Boys exploring the wet cave in 1926 found a clay bank about 400 yards from daylight and well above the stream. They wriggled over it and discovered the dry cave, an underground wonderland of cave formations, never before seen by man. The boys

told their discovery to Mr. Alexander, the owner of the farm, and he invited Messrs. Weaver and Hosterman, owners of Woodward Cave, to examine this new place with him. The beauty and abundance of the calcareous formations in the dry cave was so unusual that the three men formed a small company, and proceeded with preparations to entertain visitors.

An entrance by Mammoth Spring would necessitate all visitors being conveyed by boat, which is a slow process and limits the number of people who could see the cave in a given time, so a slope was sunk from the surface to the end of the dry cave farthest from the wet cave. This slope driven through solid limestone walls enters the cave by a flight of 115 concrete steps at a depth of about 65 feet below the surface. At the foot of the stairs a curved passage opened through a clay-filled channel brings one shortly to the exhibition part of the dry cavern. When one rounds the turn into the room called the Cathedral and the lights are snapped on, the veritable fairyland of delicate pencils and films and ponderous stalactites and blankets pendant from the ceiling, and the sturdy domes, stumps, and columns rising from the floor makes one pause in wonder and admiration.

The precipitation of calcium carbonate ranges all the way from minute drops on the roof and low knobs on the floor, through sizable stalactites and stalagmites, to complete columns, and from slender to massive, bulky forms. From the foot of the stairs through the dry cavern is about 300 yards. The first hundred yards is a plain passage through limestone; the rest is a gallery of Nature's artistry, assembled in rooms called the Cathedral, Garden of the Gods, and Chamber of Statues. Pictures explain what is to be seen far better than many words.—And to think that all of this dry cave was discovered by two boys who were venturesome enough to crawl like worms through a crevice less than a foot high.

The dry cavern meets the wet cavern nearly at right angles and ends at a dock where boats are moored. From the junction a straight passage way a few feet wide extends northeast, the owners say for nearly one-quarter mile. There the roof comes down to the water and prevents further progress. This passage is accessible only by boat and visitors are not taken into it because all that is of interest can be seen from the dock.

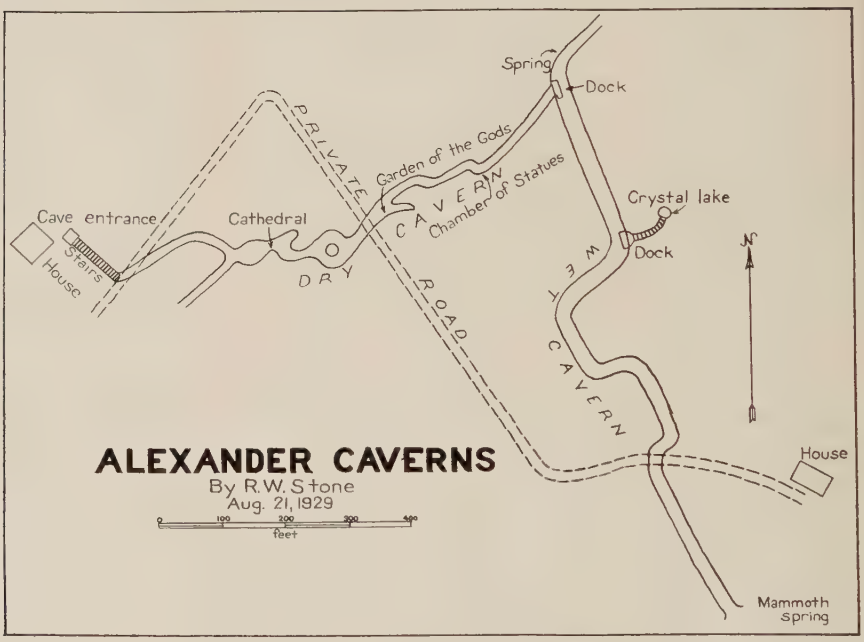
From the dock to Mammoth Spring, where this branch of Honey Creek comes to daylight, is over a quarter of a mile, making the boat trip half a mile long, as it ends where begun. On this trip one disembarks to see a small pool closely overhung and surrounded by delicate cave formations, and lighted by colored electric lamps. Beyond this point the wet cavern makes some nearly right angled turns, which have developed along vertical joint planes in the nearly hori-

2. Chamber of Statues, Alexander Caverns

3. Garden of the Gods, Alexander Caverns

zontal beds of limestone. Here, and along lesser joints, stalactites and blankets of drip stone hang down over the water. Encrusted forms along the bank of the stream have the semblance of animals; the ceiling is high and then low, and the walls are far apart. Near the exit a low clay dam makes deeper boating water.

The greater width of the wet cavern, ranging from 40 to 160 feet, the much greater height, up to 65 feet above the water, and the somewhat different character of the formations, together with the fact that one rides in a boat propelled by an outboard motor along this brilliantly lighted underworld makes the trip through the wet cavern an experience never to be forgotten. So far as the writer knows there



4. Map of Alexander Caverns

are but two others like it in America and one of them also is in Pennsylvania. The wet cavern is not so much a bright fairyland of delicate formations as the dry cavern, but has a different appeal because of its great size. Some people think the trip through the wet cavern is the more interesting of the two. On the return trip, although the same route is followed, the formations are seen from a different angle and have a different aspect.

The usual trip through the caverns takes an hour and a quarter; through the dry cavern alone three quarters of an hour. The temperature in the cave is 52° at all times.

Over sixty formations in this cave have been named; some of them

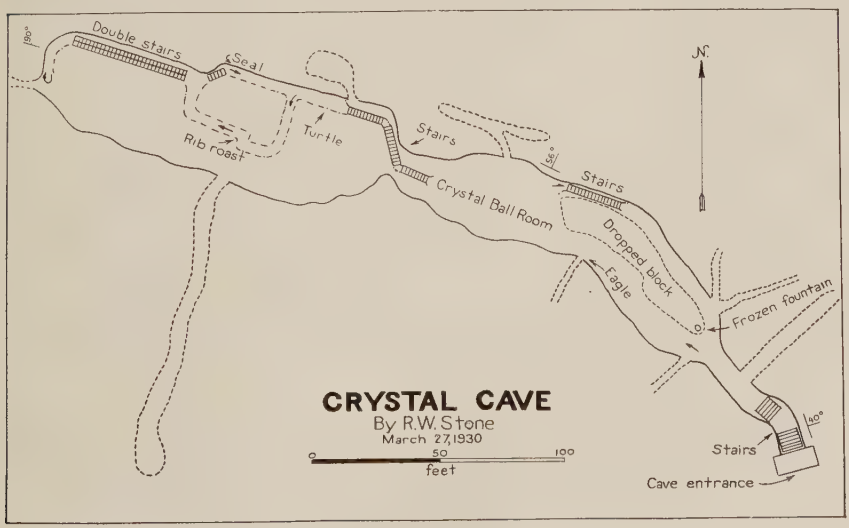
are pure white, some cream-colored, and some streaked with red; all are well illuminated with electric lights. Parking space and other conveniences are provided for visitors. The cavern is operated by The Alexander Caverns Company, Naginey, L. L. Weaver, president. Mr. C. F. Kerstetter is resident manager.

CRYSTAL CAVE

Along William Penn Highway, Route 22, between Reading and Allentown, wayside signs notify tourists of the proximity of Crystal Cave. It is in Berks County, 5 miles west of Kutztown, about 20 miles from Reading, and 2½ miles from Virginville. A township road, kept in good condition by the owners of the cave, leaving U. S. Route 22 just west of Kutztown is the usual way of reaching this spot.

Crystal Cave was opened to visitors in 1873 and so has been longer in service than any other cave in the State. It was discovered in 1871 by William Merkel while quarrying limestone on a hillside 80 feet above the creek. In March, 1872, Gideon Merkel, owner of the property, sold it to Samuel D. F. Kohler for $5,000. Kohler built a house, road, and expended a considerable sum in improvements before offering the cave for public inspection.

The situation in the midst of farming country, with woods near by, and ample provision for visitors needs and comfort, as well as interest in the cave itself, has brought city people to this place seeking rest, and farmer folk bent on recreation. Thousands of people have visited the cave yearly for five decades; the largest number of paid admissions in a single day was 3,900. Summer holidays bring



5. Map of Crystal Cave

6. Drip Stone in Crystal Cave

the largest crowds. Picnic, parking, and camping grounds are available, and a lunch counter is maintained.

Crystal Cave is small but it is a roomy cavern and not a mere crevice; furthermore, it has a variety and abundance of cave formations that make it worth seeing, even for those who have been in other caves. Crushed stone paths, concrete stairs with handrails, and indirect electric lighting are the up-to-date arrangements for the comfort of the visitor.

7. Rear Cavern in Crystal Cave

The limestone beds at the entrance dip NE 40°,* in 150 feet they dip NE 56°, and from the Crystal Ball Room to the end they are vertical. Narrow fissures branching off from both sides of the main passage just inside the cave are along joints. The main part of the cave was produced by solution of the limestone in a series of more soluble beds, at or near the level of ground water.

*Dip is the angle at which beds or strata are inclined from the horizontal. Strike is the course or bearing of the outcrops of an inclined bed of rocks on a level surface.

The first formation noted in the cave is a conical stalagmite called Frozen Fountain. Here the 12-foot entrance widens to 30 feet but a great dropped block occupies part of the floor. The accumulation of cave onyx on top of this block of limestone indicates that it has lain in its present position for thousands of years. Beyond it is the Crystal Ball Room, a wide open space on one wall of which is a deposit of sparkling white calcite crystals. It is from these crystals that the cave got its name.

A flight of steps leads to a higher level and a larger room, about 40 by 150 feet, from the far and upper end of which one gets a good view of this underground wonderland. The vaulted ceiling in blue, orange, buff, and white is hung with small stalactites, and the floor is studded with stalagmites that average 2 feet high and 8 inches in diameter. Here too are thin sheets of white drip stone banded with brown and resembling ribbon or strips of bacon. The cave onyx assumes many shapes, some of which are easily recognized as having the form of an eagle, hand, catfish, cathedral roof, prairie dogs, seal, beehive, owl, turtle, rib roast, castle, frozen water fall. As in several other caves, some of the stalactites give out a musical note when struck and are known as the organ pipes or chimes. One of the formations requiring the least imagination to recognize is called the Seal, for it looks like a seal that has climbed up on an ice cake and still glistening with water.

Crystal Cave is about 360 feet long or the length of a city block. In the Berks County history it is stated that the cave has been explored for a distance of over 2,000 feet; if so, the explorers must have passed through openings too small for use by visitors. The concrete steps are flushed clean with a hose and the cave is kept so clean that one could safely view it while wearing white clothes, but the constant temperature of 52° makes heavier clothes desirable.

The following bit of imaginative writing is from the history of Berks County.*

"Imagination has seen in the curious forms assumed by the pilasters, the stalactites and the stalagmites a vast variety of resemblances to natural objects, and one of the most legitimate means of training the imagination is to rethink these likenesses and to imagine others. The eagle-rock shows a remarkable likeness to the national bird in the act of preying upon some innocent member of the feathered tribe, and in the throes of death dame nature crystallized both victor and quarry and held them there, an emblem of the gigantic struggle which placed craft and brains to the front. Anticipating by thousands of years the conical form of a plate of ice cream, or as though nature in

*Montgomery, M. L. Historical and biographical annals of Berks County, Pa., Vol. 2, pp. 821-2, 1909.

one of her tyrannical moods visited her wrath upon a race of Titans about to partake of a refreshing dish of orange ice already placed on a spacious table and transmuted the delicacy into stone, the tempting dish, some two feet high, has stood there unmelted all these centuries, waiting the magic spell to unlock the stony molecules and to join the once toothsome cream to the palate. Indeed, it seems as though that tortuous cavern was about to witness a carnival of the giants. The disembowled intestines of some massive mastodon are still there; the rib-roast was partly sliced and ready to be served; the fowl was baked and watermelon slices and a mammoth fish awaited the repast. But the giant hand of the caterer, like the hand on the wall of old, was stilled; the bulky tooth which was to crush these viands was severed; and the prairie dogs which were waiting for the bones of this breakfast of the gods are now silent in the gloom. The lily chamber, which fancy pictures as the spare room for the giantess, and the massive cathedral room, with its three hundred frail stalactites, the idol chamber (these strange beings must have been idolators), the bridal veil and all the other myriad evidences of revelry, of remorse and of splendor are carved out of those stupendous rocks with a realism which commands the admiration of sculptors. Mother nature, to complete the ghastly scene, has caused the body of the giant chief to be embalmed and placed in a sarcophagus in a spacious crypt, as in the catacombs of ancient story.

"A natural curiosity of such magnitude and interest should be visited by every person who has the opportunity to do so."

This cave is owned by Crystal Cave Company, Inc., J. D. Kaufman, president, Berks County Trust Building, Reading, Pa. H. B. Simpson is local manager and M. O. Hill the chief guide.

HIPPLE CAVE

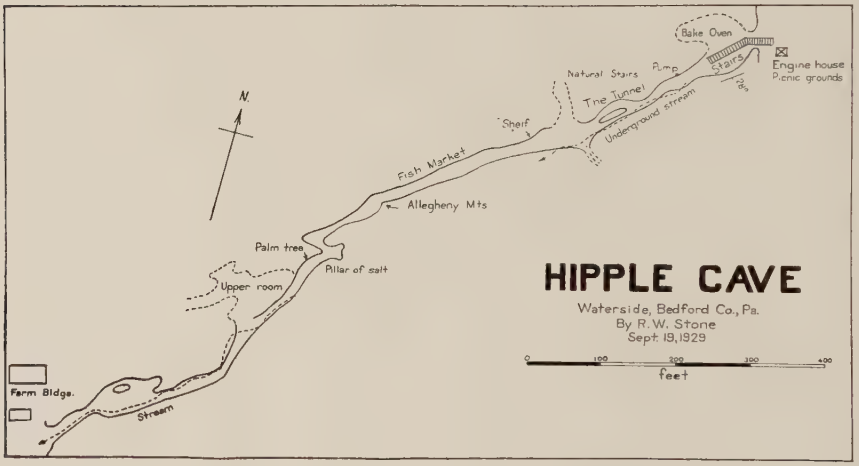
The only commercial cave in Bedford County and the one nearest the Lincoln Highway is Hipple Cave at Waterside, 12 miles north of Everett and about 22 miles south of Altoona. At Waterside one leaves the highway and drives along a country road 800 yards to a well-kept picnic ground in a grove. The grove includes two sink holes and the entrance to the cave. The cave is owned by Mr. H. S. Stonerook, whose address is Waterside.

According to tradition the cave was discovered by the owner's great-grandfather, a pioneer named Hipple, who tracked a bear to the hole. The cave has been known for several generations, but the advent of a good highway and the resulting increased traffic is responsible for the commercialization of the cave in 1928. Mr. Stonerook built a dance pavilion, shelter, fire places, and other conveniences for picnic parties. Electricity for lighting the cave and grounds and to operate a pump

in the cave to furnish water in the picnic grounds is made by a generator driven by a gasoline motor.

The cave is in limestone beds dipping SE 28° and the course of the cave is along the bedding. The entrance, called the Bake Oven, is a large chamber, through which visitors descend by a flight of 50 steps to a low passage. Near the foot of the stairs a small stream dashes into view and follows along the tunnel for 200 feet. For a few rods the roof lacks head room, but shortly the ceiling rises to 50 feet and from here on to the end of the cave, a distance of 300 yards, the passageway is of ample dimensions.

About 300 feet from the entrance a joint at right angles to the strike of the beds enlarges the cave. The ceiling is 50 feet high and



8. Map of Hipple Cave

on the right is a steep passage 30 feet above the path, called the Staircase. On the left is a narrow fissure which small boys who have explored it say leads to another room. A small stream enters here and on the floor is a cave formation that looks like a footrest for a bootblack stand. A shelf about 9 feet wide projecting from the right wall is a less soluble layer in the limestone. Here begins The Tunnel a straight passage about 400 feet long, with plenty of height, width, and a smooth floor. On the floor near the far end of this stretch is a thin, sinuous ridge 2 or 3 inches high that once formed the rim of a pool. This formation is called Allegheny Mountain.

The cave makes a sharp turn or offset and resumes its general southwest course. Just around the bend is a large stalagmite called The Pillar of Salt, and a complete column, called Palm Tree, which although tapering downward, has formation at the top suggestive of fronds.

9. Palm Tree, Hipple Cave

Stairs lead to a shelf above the main passage, and here one sees a shadow profile of Lincoln's head and two ceiling depressions several feet long, one like the print of a pointed-toe shoe and the other like a human foot. Still higher is another passage with good stalactites that should be lighted, for these formations are few and dark in this cave. Here the underground stream appears again and is in sight until it emerges at the surface. The roof is so low at the end of the

10. Statue, Hipple Cave

cave that visitors stoop to see daylight beyond, but turn and retrace their steps to the entrance.

The cave is about 1,200 feet long, which makes the trip through it nearly a half mile walk.

Other formations pointed out in this cave resemble a turtle, alligator, owl, dog, child, leaf tobacco, water falls.

The picnic grounds are an attractive spot, being in the hills, surrounded by cultivated fields, and add much to the pleasure of a visit to this cave.

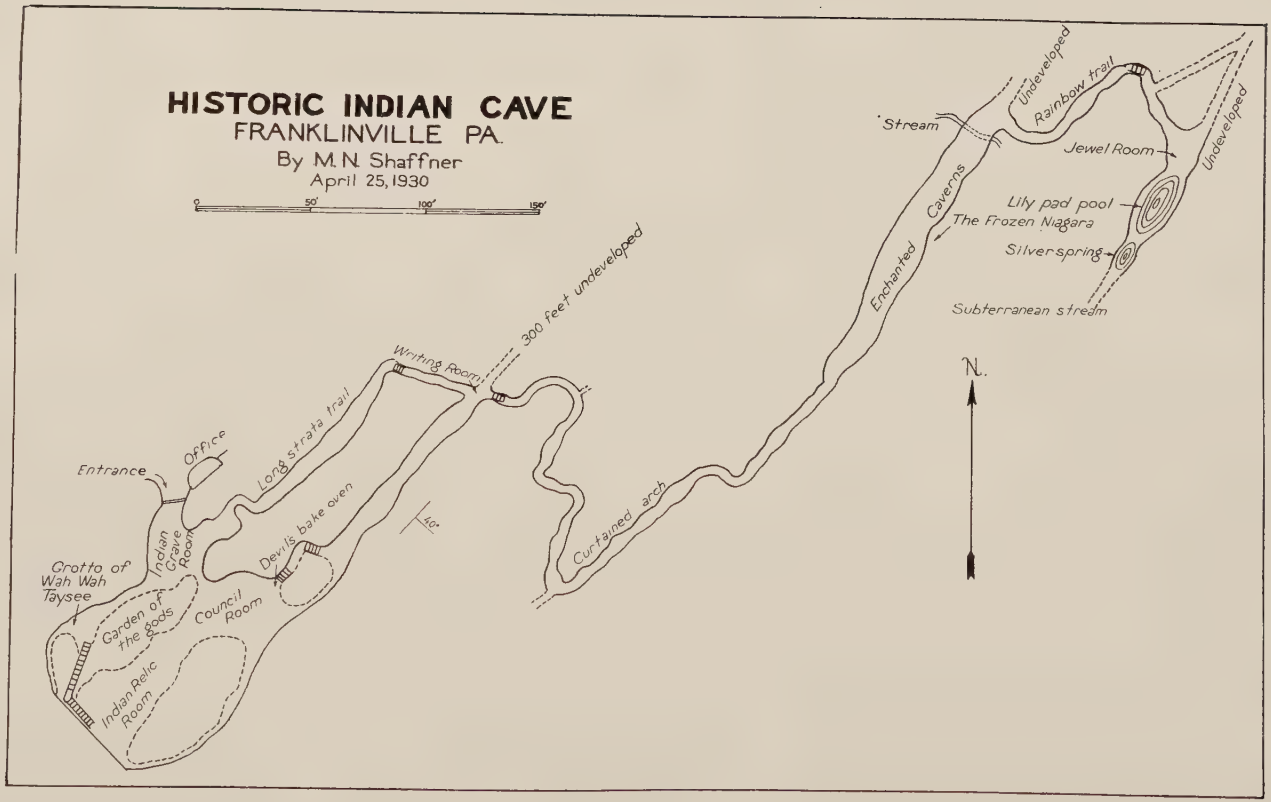
HISTORIC INDIAN CAVE

When white men first entered central Pennsylvania by way of Juniata River, they found an Indian trail from Water Street leading up Spruce Creek. On the bank of this beautiful stream were many delightful camp sites, and one of them was particularly favored because close by in the limestone bluff was the entrance to a large cave where shelter could be had in case of storm. From time beyond memory Indians frequented it. In 1816-20, David Lewis, the Robin Hood of Pennsylvania, and his band of highwaymen, used this cave as a retreat and perhaps as a storehouse for their plunder. This self-styled "equalizer" who robbed the rich and gave to the poor was guarded and fed by a family living near the cave.

11. Entrance to Historic Indian Cave

Historic Indian Cave is in northern Blair County on Pa. Route 45 at Franklinville. This hamlet is about 13 miles east of Tyrone and 8 miles north of Water Street on Wm. Penn Highway. The cave is barely 100 yards from the macadamized highway leading to State College, and therefore is readily accessible. The cave gets its name from the evidence of Indian occupation found in it.

In 1928 Mr. and Mrs. Harold A. Wertz bought a part of the farm on which the cave is located, and proceeded to explore the underground passages, then to prepare the cave for the reception of visitors. As the passages were found to be interminable, only that part of the cave within easy walking distance of the entrance was developed.



12. Map of Historic Indian Cave

Concealed electric lights were installed, accumulations of clay removed, paths graded and built of crushed stone and concrete. In leveling the floor of the first room stone arrow and spear heads, fragments of pottery, and other evidences of Indian occupation were unearthed to the number of 400 articles. These relics are on display in the cave where they were found. They have been identified by Neil M. Judd, curator of American archeology in the U. S. National Museum as having belonged to Iroquoian and Algonquian tribes. Human bones and teeth and a nearly complete skull were found in the clay floor just inside the entrance. These were reported by Dr. Gerrit S. Miller of the U. S. National Museum to be the remains of Indians, and to have been buried well over 200 years. Many teeth of young beaver were found in the Council Room, 3 or 4 feet below the floor. Some of the bones are on display in the Carnegie Museum at Pittsburgh and in the State Museum at Harrisburg. Evidence of more recent visitors is found on the wall of the Writing room, near the entrance, where many initials and dates are inscribed in soft calcite on the wall of the cavern. Here the late Mrs. J. M. Chaney of Franklinville who was born on Spruce Creek in 1837, and played in the cave as a child, found her initials 75 years after she placed them there. Not many country children eventually see their former playground become a mecca of historic interest visited by thousands every month.

Flow stone and drip stone are unusually abundant in this cave and the various rooms and passages are lined, hung, and studded with stalactites, stalagmites, and cascading curtains of calcium carbonate, all revealed by hidden lights. Among the formations pointed out by the guides are elephant heads, giant hand, Buddha, virgin and child, bake oven, dog heads, leaping fish, praying virgin, owl, Indian chief, and frozen Niagara. This latter is a wall of white drip stone resembling a cataract that has become ice-locked as it plunged down the side of the cave. This is one of the prettiest features to be seen here.

Another is the so-called Lily Pad Pool, a grotto far back underground where calcium carbonate has been precipitated around the edges of small pools and has built up narrow little walls or partitions at different levels occupied by the standing water. Colored electric lights thrown on a small fountain add to the beauty of the setting. A spring of crystal-clear water forms an upper pool which discharges over a natural spillway to the lower pools.

The most novel feature in the cave is the grotto of Wahwah-taysee, where a luminous mineral on the ceiling glows like a myriad of fireflies when the lights are turned off. According to an Indian legend from which this room derives its name this section of the cave was shunned by the Indians, who believed the "glowing room" to be the haunt of evil spirits.

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13. Council Room, Historic Indian Cave

14. A Few of the Many Ancient Indian Artifacts Found and on Display in Pennsylvania's Historic Indian Cave, Franklinville, Huntingdon County

The limestone beds at Historic Indian Cave strike N 40 E and dip SE 40°. The cave is developed mostly along joints and the pattern therefore is somewhat rectilinear, characterized by long, narrow passages. As at present developed, the route over which visitors are guided is about 1700 feet or a third of a mile, including about 500 feet of retraced steps. In a cave, however, as in a city street, the view from the opposite direction is different.

Mr. and Mrs. Wertz have explored long stretches of the cave, possibly more than a mile, and found the remains of ladders placed at difficult points by some former explorer, probably by a local resident who spent years here in a vain endeavor to find robber Lewis' treasurer. The explored but undeveloped parts of the cave are difficult of access by reason of small passage or openings choked with clay, and so are not shown to visitors.

The accumulation of drip stone and flow stone, and the size of some stalagmites suggest that this cavern must have been formed thousands and thousands of years ago. If, as is generally believed, it takes 100 years for a cubic inch of drip stone to form, then this cave has had something like its present dimensions for tens of thousands of years.

Parking space is provided along the bank of Spruce Creek, a comfort station and lunch counter are handy, and the Colerain public camp ground is only 2 miles away.

As this cave has many visitors on Sundays and holidays, those who wish to avoid a crowd should see it on other than those days. The temperature in the cave is 56°. A trip through the cave occupies 30 to 45 minutes.

INDIAN ECHO CAVE

The cave in the bank of Swatara Creek near Hummelstown, Dauphin County, has been known for years as Hummelstown Cave, from its location, and as Echo Cave, from the fact that in certain places the walls return sound sharply. The word Indian was added by the present owners. This place might well have been called Wilson Cave also, for a man named Amos Wilson lived in it for 19 years. This was more than a hundred years ago when means of communication were slow and bridges not plentiful. Wilson's tale hangs on these conditions. It seems that his young and much-loved sister was betrayed and abandoned by her lover. She was accused of killing her child, which was born out of wedlock, and was sentenced to be hanged. The Governor yielded to Amos Wilson's pleas and granted a pardon but Wilson was delayed on his return from Philadelphia by swollen streams, and reached the place of execution with the pardon too late. Remorse over the cause and manner of his sister's death made him shun human society and for 19 years he

lived alone in this cave. He spent some time in philosophical writing, and from his publications and mode of living came to be known as "The Pennsylvania Hermit." Visitors to Indian Echo Cave are shown the place where Amos Wilson had his bed, table, and fire. As the temperature of the cave varies with the seasons from 38° to 56°, it is evident that Wilson needed a fire for warmth as well as for cooking.

Indian Echo Cave is just off William Penn Highway, U. S. Route 22, at Hummelstown, 10 miles east of Harrisburg. It is reached by turning south at Hummelstown ½ mile on the road to Middletown. This cave was opened to tourists in 1929 and a hotel was built to accommodate them. Picnic and parking grounds are provided, and concrete stairs with handrails were built to make the big mouth of the cave in the limestone bluff of the creek bank easy of access.

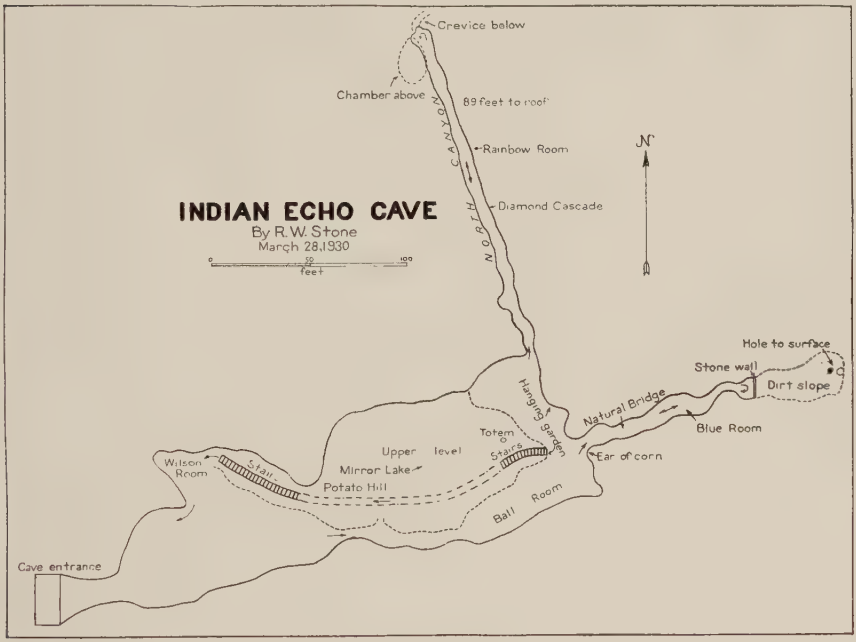
In addition to the yawning mouth of the cave there is a small entrance in the field back of the bluff. This fact and the proximity to a village made it a rendezvous for all the venturesome spirits in the neighborhood for a hundred years. There were two ways of going from the large front room to the rear, one by climbing up over a great mass of large blocks fallen from the roof many thousands of years ago, and the other by crawling through a hole at floor level. Clay covered the lower levels and water stood in some passages, but boys went into every accessible cranny. However, because the ceiling is so high that many formations were out of reach, and some were too large to be broken or carried away, a considerable quantity of drip stone remains there as nature made it.

No one seems to have appreciated the commercial possibilities of this cave until early in 1929 although it is near a transcontinental highway over which many thousands pass within a mile every day in the year. Then a company organized in Kutztown obtained possession of the property, and proceeded with the development of a resort, with the cave as the main attraction. A great accumulation of silt and trash at the mouth of the cave was removed, drain tiles laid, stairs built over the fallen blocks, and a wide passage cleared at floor level where formerly there was only a small hole. Crushed limestone paths now make walking easy, and over 1400 electric lights illuminate every part of the cave. Most of the illumination is indirect, the lamps being concealed by reflectors or by rocks. No cave in the State is illuminated better. John H. Bieber was engineer in charge of developments.

The length of the cave from front to back is over 400 feet. Two hundred and fifty feet from the entrance the cave is 80 feet wide and the ceiling about 50 feet high. From one corner of this large room a passage extends north about 200 feet. The route over which

visitors are taken is about 450 yards long or a quarter of a mile, and is traversed in 30 minutes.

The entrance is large enough to admit three automobiles abreast, with several motorcycles on the sides. However, as the cave is under a cliff on the river bank, automobiles are parked on the bluff and visitors descend by a flight of concrete steps, past a natural rock garden. The first major feature in the cave to which attention is drawn,



15. Map of Indian Echo Cave

aside from the dimensions of the cave itself, is a large stalactite, about 10 feet long and 2 feet in diameter called the Ear of Corn. This hangs at the rear of the Ball Room, and at the entrance to a narrow passage leading east. In this passage is the Blue Room, so-called because the 40-foot ceiling is distinctly blue, in contrast with the gray walls with their patches of light tan. At the west end of the Blue Room is a natural bridge overhead with a Frozen Waterfall above. This cascade of drip stone is only one of several interesting cave onyx formations in this part of the cave.

This passage ends abruptly at a dirt slope that rises to a hole extending to the surface. Returning to the Ball Room attention is called to the Hanging Garden, the name given to the upper wall and ceiling which is covered with masses of drip stone in fluted cascades, irregular terraces, flows, sheets, corrugations, and stalactites. This

16. East Canyon and Ear of Corn, Indian Echo Cave

17 Natural Bridge, Indian Echo Cave

display high overhead has never been disturbed or broken, and is effectively illumined by concealed lights.

In a corner of the Ball Room is the entrance to a narrow passage called the North Canyon that extends 200 feet at right angles to the main cave. Although the passage is narrow the ceiling in places is 80 feet high. In it is the Rainbow Room, so named for the variety of colors exhibited, and at the far end is a small room overhead with an abundance of stalactites and stalagmites. The North Canyon with its excellent illumination, narrow and high ceiling, and abundance of variously colored dripstone formations, ranks high among the most attractive cave galleries in the State.

On the return trip, visitors are taken to an upper level by an easy flight of steps, past a stalagmite called the Totem Pole, to a point where an excellent view is had of the Ball Room below, and of the Hanging Garden from another angle. Descending another flight of steps, one is in the place where Amos Wilson spent so many years, and is shown the smoke-blackened crevice which served as his chimney.

The limestone at Indian Echo Cave is in nearly horizontal beds, and the cave seems to be developed along two vertical joint planes that are nearly at right angles to each other. The very large room seems to have been formed by solution of a soft bed over a belt 75 feet wide and by spalling of the roof rock.

This cave is a fine illustration of how a dark hole in the ground by judicious expenditure of money can be converted into a glorious adventure. Almost 40,000 people visited this cave between June and December 1929.

LOST CAVE

In 1883 men quarrying limestone about half a mile east of Hellertown, Northampton County, discovered a cave at the base of a limestone ledge. Because of its location close beside a good road only four miles from Lehigh University at Bethlehem, it has for many years been visited by students, for educational purposes.

In the spring of 1930 this plot of ground was purchased by E. C. Gilman and formally opened to the public May 24, 1930 with the name Lost Cave. Good walks and concrete stairs have been placed, electric lights installed, passageways enlarged, and picnic grounds with parking space provided. By removing earth and loose rock from passageways and by enlarging crevices, rooms never before seen by man have been opened. These new rooms are hung with stalactites and crystals of cave onyx sparkle in the drip stone that covers the walls.

The passages are irregular, winding, with many grades and some concrete stairs. The length of the cave in a straight line may not be

more than 400 feet but the windings and the side galleries make the length of open passageways about 800 feet.

One new room has been discovered that is about 150 feet long, 30 feet wide and 30 feet high, containing many fine white formations.

The highest ceiling is about 70 feet and the cave at its widest place is about 60 feet.

In the Lake Room the floor is covered with about 4 feet of water. This room is about 40 feet long, 15 feet high, and 15 feet wide, and has many stalagmites.

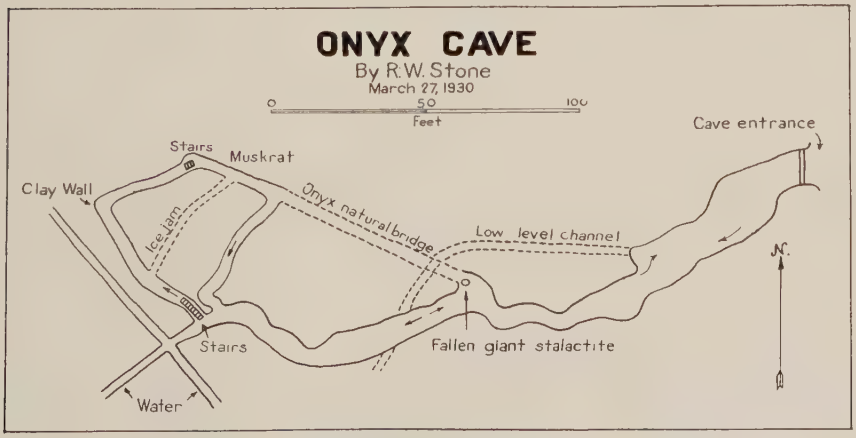
An underground stream having an estimated volume of 300 to 500 gallons of water per minute may be seen for about 70 feet in a newly opened room and also in another room.

The temperature of the water and cave is 50°.

ONYX CAVE

Onyx Cave is in the northern end of Berks County about 17 miles north of Reading, 4 miles from Shoemakersville, and 2 miles from Virginville. It lies in the hills a mile west of Maiden Creek and along a township road. The cave was prepared for public inspection by clearing paths, building board walks, and installing electric lights; and was opened to the public by Edwin Dietrich in May 1923. The common use of the automobile had by this time made touring popular, had improved the country roads, and people in increasing numbers were getting away from the main highways.

This cave has been known since 1872 when blasting in a limestone quarry broke into it; but for 50 years it remained unused. Mr. Dietrich built a lunch room, provided a parking ground and facilities for picknickers, and advertised it as Onyx Cave, named from the calcium carbonate or cave formations striped in white, brown and



18. Map of Onyx Cave

red like true onyx. In April 1929 the cave was sold to A. S. Hunsicker, R. D. 2, Hamburg, who has further improved it with crushed stone paths and concrete steps.

The limestone beds are nearly flat and the open passages are along vertical joint planes. The cave is 12 to 15 feet wide, in the first 60 feet. Where it narrows down to 8 feet a channel at a lower level branches off and continues for 100 feet or more. It is illuminated but not traversed. About 125 feet from the entrance a fissure along a straight joint leads off to the right for 100 feet. A large stalactite fallen from the roof thousands of years ago lies on the floor at this point. This fissure is spanned by a deposit of cave onyx or flow stone probably deposited on clay that filled the lower part of the fissure. After the lime was deposited to a depth of several inches the clay was washed out, leaving a long narrow natural bridge. This brightly lighted fissure, lined with drip stone, bridged with flow stone and with stalactites hanging from the ceiling is one of the striking views in this cave.

The main cavern continues for 60 feet with a width of 8 to 10 feet and a high ceiling, then turns to the right along a joint parallel with that called the Natural Bridge; at the turn are calcareous formations called The Monument, Cathedral, Turkey, and Pipe Organ. Thirty feet farther along, as shown by the map, the cave branches in three directions. To the left are narrow solution channels along joints crossing at right angles. Water stands in the cross passage and the walls are reflected in the pool.

At this point one ascends 15 steps and sees formations named Crouching Tiger, Statue, Owl, and Ice Jam, and comes to the turn which is the point in the cave farthest from the entrance, about 275 feet along the route followed and less than 250 feet in a direct line. A few steps bring one to the inner end of the natural bridge and a view along its length. Here one sees a calcite deposit shaped like a muskrat, and the 6-foot clay filling of a channel that leads to the formation called the Ice Jam. Another turn brings one back to the first stairs, and thence the main passage is retraced to the entrance.

The trip through this cave is about 220 yards or the length of two short city blocks. Although this is one of the smallest caves, it contains much of interest, and from a geologic standpoint has a greater variety of features than some of the larger caverns.

PENN'S CAVE*

More history and legend has been written about this cave than any other in the State. It is in Brush Valley in the eastern end of Centre County, 4½ miles from Centre Hall, which is reached easily over

* The history and legend concerning Penn's Cave in the following paragraphs is from "Penn's Greatest Cavern," a brochure of 96 pages compiled by Henry W. Shoemaker, and published at Altoona, Pa., 1921.

Pa. route 53 from Bellefonte or over Seven Mountains from Lewistown. In these days of fine highways, getting to Penn's Cave from Lewistown is a matter of 30 miles or an hour; in pioneer days it was not so easy.

The cave got its name from Penns Creek which rises in it. Originally this was John Penn's Creek, named so by Captain James Potter in 1764 in honor of the grandson of William Penn.

According to Indian legend, a Frenchman, Malachi Boyer, from Lancaster County, entered this region about 1748, many years before white settlement had advanced west of Sunbury. He was friendly with the Indians, and became acquainted with old chief O-ko-cho and his tribe who camped on Spring Creek. The chief had seven sons and one daughter, Nita-nee. Malachi found the girl washing a deer hide, and was attracted by her beauty and industry. The liking was mutual and after a clandestine courtship—because marriage between the white and red races was frowned upon—Malachi and Nita-nee stole away one dark night, planning to reach white settlements and there make their home.

The fugitives were pursued and overtaken by the seven brothers, and Malachi was brought back to be tortured. A novel method was employed. He was thrown into the stream at the entrance of Penn Cave, where the water is said to be 30 feet deep. When he was exhausted by swimming, for the Indians kept him from climbing up on the ledge, he swan back into the dark recesses of the cave and there crawled out of the water. Indians guarded the small exit to the dry cave also, and Malachi swam and crawled about for a week trying in vain to find another exit. When hunger became unbearable and the brothers of Nita-nee repulsed every attempt at escape, Malachi used his last strength to hide himself, and there he died.

When he had failed to appear at either exit for two days his Indian tormentors searched the cave, found his body, and sank it with stones in the deepest part of the underground river.

To this day on a still summer night in the depths of the cave some who know this old Indian legend think they sometimes hear a plaintive call, "Nita-nee, Nita-nee," as if Malachi's spirit still longs for his redskin sweetheart.

Then there is the story of Mifflin Sargeant and Caroline Hager who rode on horseback from Stovers in the Narrows, tied their horses under a pine tree and entered Penn's Cave early on the morning of December 24. They had an abundance of torches and expected to light one from the other, so when a sudden gust through a crevice blew out their one lighted torch and Mifflin's few matches failed to ignite another, these lovers found themselves in difficulty.

The farmer folk living near the cave were away on a hunting trip so it was not until the third day, December 27, that the presence of the rest-

less and hungry horses called attention to the fact that someone must be lost in the cave. The young couple was quickly rescued and to this day holds the record for spending Christmas without light, fire, or food in the recesses of this cavern.

The Penn's Cave farm was surveyed in pursuance of two warrants granted to James Poh, or Poe, dated January 5 and November 3, 1773. Poe's log cabin near the large spring emerging from the cave was the first improvement in that part of the valley.

Although white men had entered the dry part of the cave through a small hole in a sink before 1800, it was not until about 1860 that the underground stream was traversed by raft. The first navigators were Isaac Paxton and Albert Woods, a school teacher and farmer from Spring Mills. They took lumber from the sawmill near the big spring

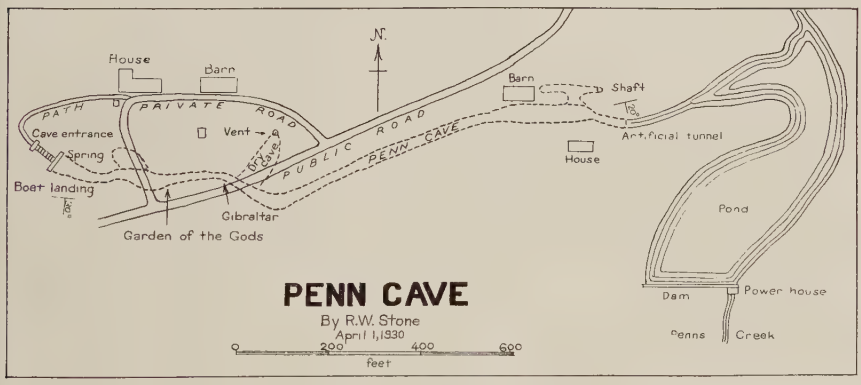
19. Entrance to Penn's Cave, showing Boats

at what is now the exit of the cave, carried it to the present entrance, and built a raft. This first trip into the wet cave must have been a thrilling experience, for the water is deep, the passage is narrow just around the turn near the entrance, and the rock walls are steep.

The lumber in the raft was rebuilt into a small boat and many picnic parties saw the cave on holidays. After 1868 the farm was owned by a man who objected to picnic parties because they might contaminate his spring. On his death in 1884 his sons, Jessie and Samuel Long, who had traveled enough to realize the value of the cave as a commercial proposition, undertook to attract visitors. They built the Penns Cave Hotel about 1885, launched a larger boat, and began charging admission to the cave. After several years, during which hundreds of people viewed this natural curiosity every summer, the business was abandoned and the hotel and cave were deserted. Messrs. H. C. and R. P.

Campbell bought the property in 1908 and the cave has been on a commercial basis since then.

Penn's Cave is the only one in the State through which visitors are taken only by boat. Until 1929 it was a trip of about 1,200 feet from the large entrance to the far end where the water disappeared under a submerged limestone ledge. Returning to the entrance made a boat ride just under a half mile long. In 1929 a tunnel driven 75 feet through the rock at the far end of the cave made an exit for boats to the old mill pond. Now visitors are taken through the cave, make a circuit of the pond, and return to the starting point, a distance of nearly a mile. The boats are broad, flat-bottomed, and propelled by outboard motors.



20. Map of Penn's Cave

The trip used to be made through the cave in darkness, a single light on the bow of the boat illuminating one curious cave formation and then another, thus adding a feeling of mystery to the experience. In 1929 and 1930 electric lights were installed at Garden of the Gods and Rock of Gibraltar and now that part of the cave is well lighted. At the far end of the cave a cluster of colored electric lights displays a particularly attractive area of stalactites. The stalactites, stalagmites, and other drip stone formations are named because of fancied or actual resemblance to the following things:

Seen on entering the cave—Eagle wings, lobster claw, Statue of Liberty, bunch of bananas, Garden of Gods, lace curtain, Strait of Gibraltar, petrified lion, coral growths, chimes, drop curtain, prairie dogs, snow slides, Pittsburgh snow drift, Niagara Falls (Canadian and American sides), trout colored stalactite, turtle shell, Lancaster County tobacco barn, Hindoo idols, giant pillars. Seen on the return trip, water falls with light-house above, scallopped ruffles, North Pole scene, Indian riding pony, leopard skins, Bilikin, Lebanon bologna, boy driv-

ing cow across suspension bridge, Indian woman carrying papoose, King Tut's stenographer carrying jug of water, wild pigeon wing, angel wings, silver rock, shadow Statue of Liberty, elephant's head.

The height of the roof ranges up to 55 feet and the depth of the water down to 35 feet. The temperature of the cave is 50°. The limestone beds dip at an angle of 30° and as the cave is along the same group of beds it is nearly straight. Now that some of the cave is lighted by electricity one sees many more cave onyx formations than before. The trip through the cave takes 35 minutes.

Tourists come from long distances to see this underground river, and are met with a welcome. Picnic grounds and parking space for cars are provided, and refreshments are available to the hungry and thirsty.

21. Formations in Dry Cavern, Penn's Cave

SEAWRA CAVE

Perhaps fewer people have seen Seawra Cave than any of the caves in the central part of the State. If so, it is because it was opened to the public so recently as 1928, has not been widely advertised, has few signboards along the highways, and is not close to an improved road. It is a cave worth seeing however, and when the road to it is improved, it should enjoy more patronage.

One reaches this cave in Mifflin County by Pa. route 522 from Lewistown or Selinsgrove to Alfarata, then turns west towards Jacks Mountain, and finds the cave by following the signs 4 miles from

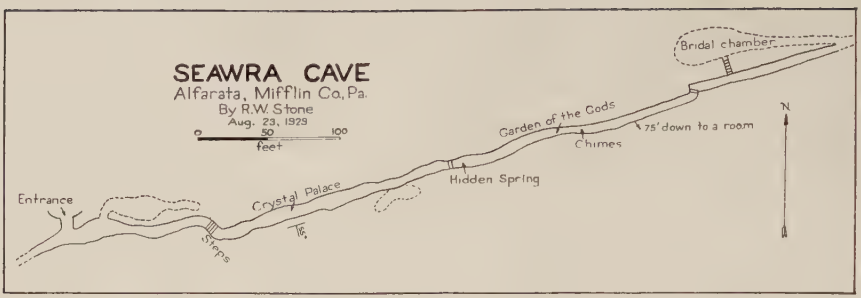
Alfarata over a dirt road. The cave is 12 miles from Lewistown, at a shady picnic ground on a low ridge parallel to the mountain.

The name is a combination of the first three letters of the surnames of the leaser and the owner, Messrs. Searer and Wray. They say that boys found the cave while hunting for treasure believed to have been buried in this vicinity by a veteran of the Civil War. The small opening concealed by ferns was enlarged, the cave explored, and its development undertaken at once. A Delco system of electric lighting was installed, a wooden bridge and stairs of a few steps were built and the floor covered with crushed limestone to make a dry path. The entrance was framed in concrete and closed with an iron gate, so that the handiwork of Mother Nature would remain as it was found. In

22. Entrance, Seawra Cave

some caves long unrestricted access has resulted in most of the smaller formations being broken off and carried away, but in Seawra as well as Alexander Cave the original discovery was followed so closely by protection and development that it has all its formations intact except what little was disturbed to make a path.

Seawra Cave is a nearly straight passage because it is along one bedding plane in limestone that dips 55°. Tourists are taken along a nearly level path about 600 feet; retracing one's steps makes the journey underground just under a quarter of a mile. This is only a part of the cave, for lights thrown beyond the end of the path and down the steep limestone wall show other chambers and passages not yet prepared for visitors.



23. Map of Seawra Cave

On entering the cave one turns to the left along a nearly direct NE 75° course. The cavity extends to the right also, but for only 20 feet or so is it open to view. A room on the left at a lower level is seen, and 100 feet from the entrance one enters the Crystal Palace. Nowhere is the cave more than a few feet wide but at this point the stalactites and stalagmites are so abundant and sparkle so like crystals that the palacial description is justified. Farther along are calcite formations called Table of the Last Supper, and Garden of the Gods. Drip stone on walls, ceiling, and floor assumes many interesting shapes, including slender and stout spines, complete columns, blankets, thin frills banded in brown like strips of bacon, and stumps, cones, and other

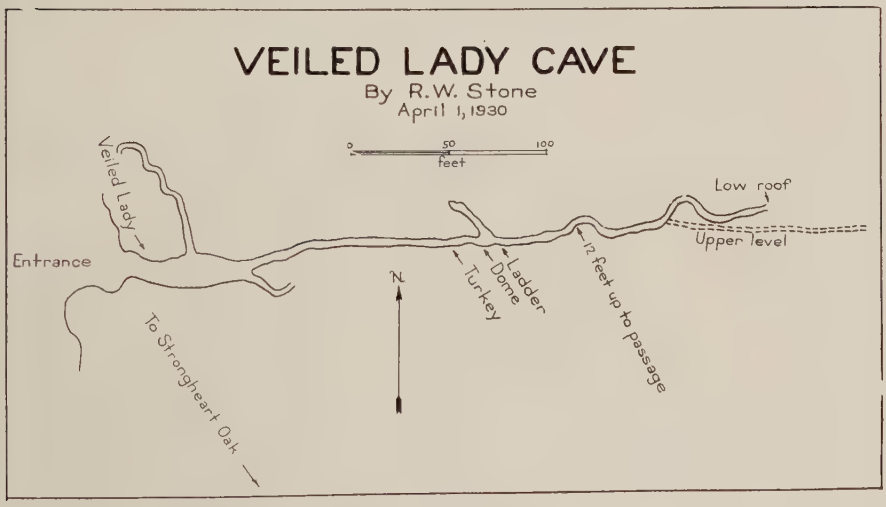
24. Garden of the Gods, Seawra Cave

shapes rising from the floor. At one point are "chimes" of calcite pendants that are musically resonant when struck. The Bridal Chamber, a room at a lower level at the end of the path is lighted and suggests what other rooms may be like that are glimpsed 75 feet below the chimes.

The trip through the cave takes about 35 minutes. The temperature is 57°, which is not too cool for comfort.

VEILED LADY CAVE

In the limestone floor of Brush Valley east of Centre Hall, Centre County, many sink holes may be seen on either side of the State Highway. These lines of depressions indicate the route of the subterranean water courses, and many of the small streams descending Nittany Mountain disappear underground. About half way between Penn's Cave and Madisonburg, near a school house and a giant oak a lane leading toward the mountain brings one within 200 yards to a depression



25. Map of Veiled Lady Cave

close to some farm buildings. Here two rills unite, and disappear in a large hole beneath a 75-foot limestone cliff, the entrance to Veiled Lady Cave. In summer the streams dry up, and then the underground water course is dry.

The cave entrance is about 15 feet wide, varies in height up to about 15 feet, and continues underground with these dimensions for 50 feet. Passages about 3 feet wide branch off on both sides, the left one following a crooked course nearly 50 feet, and the right one making a short semicircle. The limestone beds dip southeast at a low angle, and the open passages are along joint planes. In the main crevice which

averages barely 4 feet wide the descent is continuous to a point 325 feet from the entrance where the roof is too low for further progress except by crawling.

It is claimed that men have crawled beyond this point and penetrated nearly to the school house, which is about one-fourth mile from the cave mouth, and that there is a lake far underground. It seems appropriate to call it Hidden Lake for there is some doubt as to its existence and searchers have failed to find it.

Excepting the first 50 feet from the mouth, the main course of this cave as far as it is developed is a water channel in places only two to three feet wide. The ceiling of this narrow crevice ranges from only head-high to 30 feet or more, with at least two places where one may climb to a gallery 12 to 15 feet above the main level.

So far as developed the cave is practically devoid of formations. Portable carbide lamps are used for illumination, and a cement walk has been laid for the first hundred feet. The shady glen at the mouth of the cave makes an excellent picnic ground.

Mr. G. Edward Haupt, of Bellefonte, owns the farm and cave, and under his direction the passages near the entrance have been freed of clay and trash with which they were filled.

Just inside the entrance high on the left is a white formation resembling a woman seated on a ledge. This figure is the veiled lady for which the cave is named.

The story of the Veiled Lady was told to J. H. Chatham, the Poet of the West Branch Valley, who spent the later years of his life at McElhattan. While teaching school in Brush Valley in 1867, he explored the cave with some of his pupils and heard the tale from Grandmother Grenoble. It seems that the McCochrans were the proudest family in Brush Valley. It was the boast of old Michael Q. McCochran that for twenty generations neither side of his family had contracted a lowly marriage.

At an assembly of Indian chiefs with the Swedes, Hugenots, Scots, and Irish to sign papers specifying property rights, Patricia McCochran, the lovely daughter of old Michael Q. became suddenly enamored with a young stalwart and handsome Seneca warrior named Strongheart. It was a case of love at first sight, and Strongheart's proposal that she flee with him to his lodge in Canada was accepted. They planned to meet that night at the mouth of the cave.

Patricia eluded her parents and went to the rendezvous as appointed, seating herself on a ledge to await the coming of her lover with his ponies. It was bitter cold and Patricia drew her heavy veil and cloak about her with some impatience, for this aristocrat never willingly awaited for anyone. But because of her great love and desire, she restrained her impulses and waited. A biting wind chilled her and

drifting snow caught on her veil. Her body and then her mind became numb, and her heart turned to stone within her.

According to the legend, Strongheart had approached the rendezvous early, tied his ponies, and proceeded down the slippery path on foot. He stepped on a caltrap, or poisoned barb set there by some white man who hated all Indians, and with a groan of agony put the other foot down, only to have the soft mocassin pierced by another poisoned caltrap. Knowing instantly that his death was near he crawled on hands and knees to the entrance of the cave, hoping to live until Patricia arrived, and that he might die in her arms. But is was early March, Grenoble Run was swollen and pouring into the mouth of the cavern, and the rocks were covered with ice. Strongheart slipped, rolled in the stream, and his body was carried into the cavern, hurtled through the tortuous passage and disappeared far underground to the hidden lake. His last cry of pain and despair can still be heard in the depths of the cavern, and Lady Patricia, his promised bride, heavily veiled, still sits at the cavern's mouth, shrouded in white cave formation.

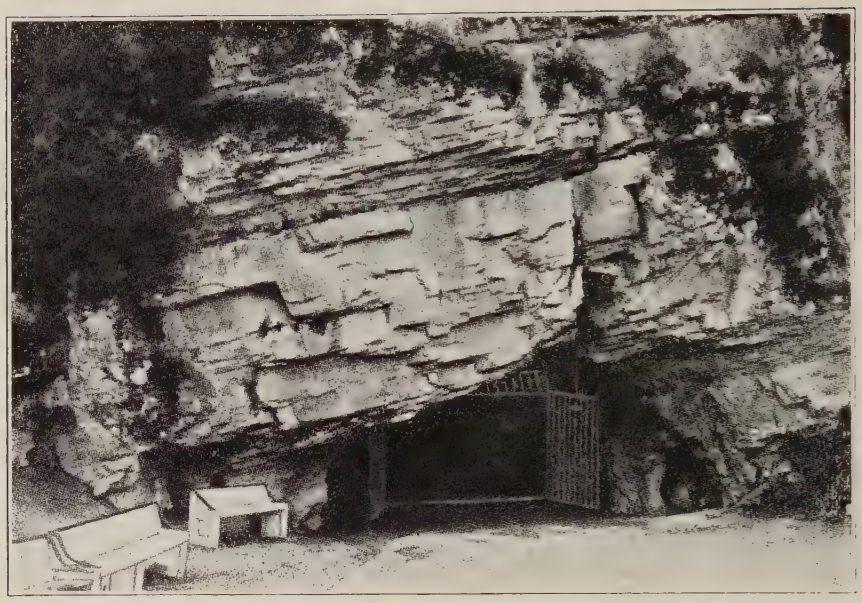
WOODWARD CAVE

Another cave in the eastern end of Centre County is known by the name of the nearby village. Woodward is on Pa. route 45 about 25 miles from Lewisburg, and 20 miles east of Centre Hall; and the cave is along Pine Creek, 2 miles from Woodward by a good road.

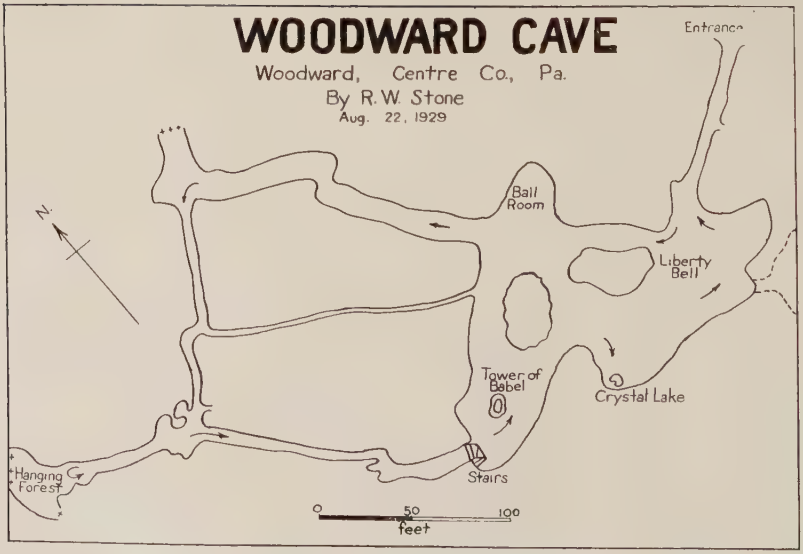
This cave was frequented by Indians before the coming of white men, and it is reported to have sheltered a band of robbers a century or more ago. The entrance is large enough to give ready access to men and horses, and highway men may well be believed to have found shelter in it.

Pine Creek used to flow through the cave in high stages, but in dry seasons it disappeared below ground before reaching the entrance. Each flood brought more mud and trash into the cave, and some passages were completely choked with clay. To put the cave on a commercial basis and exclude the creek, the owners built a long diversion channel that carries the flood water down the valley by another course. A company called Woodward Cave, Inc., consisting of L. L. Weaver, O. M. Hosterman, and Mrs. Temmie Meyer, installed a Delco system of electric lights, surfaced the clay floor with crushed limestone, and opened the cave to the public in 1925. A dining hall, picnic and camp ground, parking space, and customary conveniences are provided for the comfort of visitors. The trip through the cave is about 500 yards long and usually takes about 40 minutes.

This cave is unlike others in Pennsylvania in that the bedding of the limestone is nearly flat and the passages are along joint planes, and the walls of the narrow passages are in some places well rounded.



26. Entrance to Woodward Cave



27. Map of Woodward Cave

as if the rock had been freshly scoured by running water. The cave includes one irregular room about 100 by 200 feet, with a pillar in the middle, and several passageways following rather direct courses. In the quarter mile trip through the cave only the first 100 feet is retraced.

The principal formations are a group of stalactites called the Hanging Forest, a large stalagmitic pile called Tower of Babel, and a dainty setting around a little pool called Crystal Lake.

There is very little change in grade along the passages in this cave, and the only stairs are a few steps back of the Tower of Babel. The cave was known to the Indians as Red Panther Cave because of

28. Typical Passageway, Woodward Cave

the following legend, which has been discovered and handed on to us by the historical research of Colonel Henry W. Shoemaker, of McElhattan.

"Red Panther was the son of an aged Seneca Chief, whose tribe lived in the Valley of the Beech Tree. The beech tree from which the valley took its name was beloved by the Storm God, and was reverenced by the Indians throughout the entire section. The beech was immune from the lightning of the Storm God, and under it the tribe would gather during fierce electrical storms, knowing that beneath its protecting branches they would find shelter and safety.

"Personal triumphs, however, turned the head of Red Panther, and he became cruel and warlike. He respected neither the beech nor the

Storm God, and often threatened to destroy the tree to show that he considered himself mightier than the Great Spirit. Finally, upon his return from an unusually successful hunting expedition, the young brave cut down the tree in spite of the pleadings of his aged father. Red Panther then ordered his favorites to cut it into proper lengths, and when this was done, the sticks were carefully laid in a heap and the proud warrior leaned forward to light the blaze himself.

"As he did so, a sudden and terrific peal of thunder echoed from the clear sky, followed by a stroke of crimson lightning. The entire tribe was stunned by the shock for an instant, and upon their recovery, the lifeless body of Red Panther was discovered lying across the newly kindled fire. The Storm God had taken his revenge.

29. Hanging Forest, Woodward Cave

"Mountain River, the young brave's father, was the first to reach his side, and lifted up his son's body tenderly. Not a mark of any king was found on the corpse, but life itself had departed.

"Hoping to appease the wrath of the Storm God, the chiefs of the tribe decided to place the body in the cavern in a near-by hillside, which had long been reverenced in religious ceremonials. After prolonged prayer, the mortal remains of Red Panther were taken to one of the largest of the chambers in the cave and placed in state. Chanting the tribal funeral dirges, the guard of honor withdrew, leaving the corpse alone in its natural sepulchre.

"After due time, in which all manner of supplication was offered,

Mountain River and his chiefs returned to the cave, expecting that the Storm God would relent and restore the young man to life. Instead, they found that water from the roof of the cavern had fallen on the body and the luxurious bier on which it rested, turning the whole into solid stone. The outlines of the body were preserved perfectly in the rock formation, and fearing another sacrilege, Mountain River and his followers withdrew, leaving Red Panther to sleep his last sleep undisturbed."

UNDEVELOPED CAVES.

ARCH SPRING

On a branch of Sinking Run in Blair County about 5 miles south of Tyrone, and 2 miles from Union Furnace is a small settlement known as Arch Spring, the name of which is derived from a limestone arch through which Sinking Run emerges to daylight.

The report on the geology of Blair County* published in 1881 contains the following account of the cave and spring: "A small stream flows east for a mile and a quarter, and then sinks into a large cave. From the cave to Arch Springs, a distance of 4200 feet there is no surface flow of water, as it all flows through the cave."

On a visit to this place in August 1924, the writer found between the forks of the road above Arch Springs, 3 sink holes, two of them conical with nearly vertical walls, and the third irregular in shape, about 50 feet deep, and 150 to 200 feet across with steep sloping sides. All three of these have pools in the bottom which I believe are the course of Sinking Run here flowing deep below the surface. Just above the forks of the road is another sink hole, or a steep short rocky ravine in which a stream emerges at the upper side from a cavity which is wholly occupied by water, and after flowing about 75 feet in the open disappears in the entrance to a cave. This entrance is wedge shaped, under limestone beds dipping SE about 15°, and measures about 40 feet across the floor and 12 feet at the highest point.

When the stream is normal height it is at the right side of the cave and one can enter for about 175 feet. At this distance from the mouth water several inches deep covers the floor but the cavern continues and an overhanging ledge has some drip stone on its edge. It is possible that by wading one could go farther but this would be a bad place to get caught in if the stream should rise suddenly after a summer storm. Here on the left the cavern is open up the slope for 40 feet or more and at the upper side a small gallery along the bedding extends southwest for several rods at least. The floor of the upper cavern is wet, slippery clay and must be traversed with care. Along the

*Platt, Franklin, The Geology of Blair Co., Second Geological Survey of Pa. Report T, p. 80, 1881.

length of the cave on the left side is an accumulation of consolidated breccia and gravel.

The next appearance of Sinking Run is just above Arch Spring where there is a steep-sided sink hole about 100 feet long, 50 feet wide, and 30 feet deep with a pool in the bottom. The stream which makes this pool passes out through an arch 12 to 15 feet in diameter, through a limestone ledge about 20 feet thick. This is the arch which gives the place its name.

BEAR CAVE

On the west side of Chestnut Ridge in Westmoreland County is a small cave that may be reached by following a washed out lumber road to an old orchard which is about one and one-half miles from the town of Hillside. The cave is just above the orchard in a ledge of cross-

30. Cross-bedded Limestone at Entrance to Bear Cave

bedded siliceous limestone which is known locally as "blue stone," and to geologists as the Loyalhanna limestone. The limestone dips N about 15°, and the cave is mostly along the bedding. Two or three sizable holes in the ledge lead into the same cavern, and in wet weather a small stream enters through one of the holes.

When the writer visited this place in April 1930, accompained by M. N. Shaffner, it was found easy to work down the slope 300 to 400 feet through wide and narrow passages, but this brought us to places where the walls were too close to go farther without lying down or crawling in water. Several passages lead to the right and left 50 feet or more, but became so narrow that we did not follow them farther. Some of the passages are on vertical joints, and some on thin bedding planes.

Those going down the slope are more or less parallel. Local people told us that passages have been explored a mile or more in this cavern. This may be true, but one would need a guide familiar with the more distant parts of the cave in order to find the passages leading to them.

No stalactites or stalagmites were seen in the part of the cave visited although a little drip stone was found on the floor, and on the ledge or face of some fallen blocks to one side of the main passage.

This cave is said to be on State owned land, and is open at all times to any one who wishes to visit it. It seems to be a favorite goal for summer afternoon hikers, perhaps because of the shade, coolness, and good drinking water.

BETHLEHEM

It is reported that a cave under the Sun Inn opposite Hotel Bethlehem in Bethlehem, Northampton County, once gave access to the creek and later was used for sewage disposal but the entrance to this cave has long been filled and nothing can be learned of it now.

Also along Lehigh Valley Railroad south of Calipso Island in Lehigh River, is the mouth of a cave which is reported to have considerable lateral extent, but it is now fouled by river overflow.

CARPENTER CAVE

This tiny but pretty cave is on the old Carpenter farm now owned by Dr. Edward Hart of Lafayette College, and is situated in Northampton County, a quarter of a mile from the Delaware River and about a mile northwest of the little village of Raubsville. One must be athletic, and not too large to explore this cave because, first, the entrance hole, which is less than 3 feet across, drops 6 feet vertically and, secondly, the crevices are very narrow and oftentimes so blocked as to require wriggling along the floor to get past.

When the writer visited the cave, he went back over 100 feet, but the latter half was achieved more by climbing and squirming than it was by walking. The main crevice is sinuous and slightly descending from the entrance, and there are several minor off-shoots that undoubtedly could be gotten into if considerable effort was expended.

As a whole, this cave has neither the beauty nor size of some of the previously mentioned caverns, but it does contain some beautiful drip stone having a clean snow white translucency. Also there are some small "lily pad pools" on the floor, and one large stalactite and stalagmite joined to form a column 9 inches through and 2 feet high.

COBURN

Near the village of Coburn in the eastern end of Centre County, according to literature, is a place on Pine Creek known as Caves of

Coburn, and said to contain a stalactite known as "Red Panther's funeral pyre." This seems to refer to the cave now known as Woodward Cave which is about 7 miles up Pine Creek from Coburn.

On the Thomas Z. Stover farm about 2 miles above Coburn is a cave that has a reputation of considerable extent. This cave is located in the woods about one-quarter mile west of Stover's farm house in a sink hole area. The mouth is large enough for a man to enter readily, but diligent search with a lantern failed to disclose a place where, at the present time, ingress could be had for much more than 100 feet away from the surface. There were indications of former passages, now closed however, and it is possible that some places were overlooked through which, by following an irregular course between fallen blocks, or through circuitous channels one could penetrate to greater depth. Mr. Stover told of a boy having been lost in the the cave many years ago, and when finally rescued was underground in the proximity of the school house which is about one-quarter of a mile from the mouth of the cave.

On the farm of H. P. Weaver, 2 miles south of Milheim and just above Coburn is a large spring issuing from a limestone ledge. As a dam has been built at the spring, the water is backed up underground, and the cave, if there is one here, is not accessible.

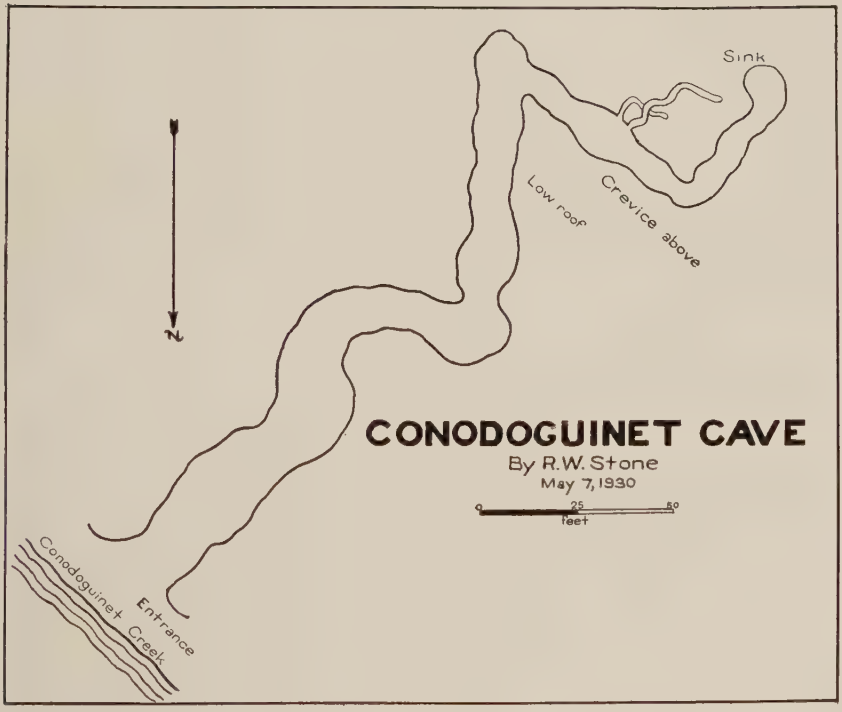
CONODOGUINET CAVE

In the bank of Conodoguinet Creek 1½ miles north of the square in Carlisle, Cumberland County, and 200 yards above a mill dam is a cave that has long been open and often visited. The entrance is at the base of a limestone cliff called Cave Hill, and is so close to creek level that flood waters enter.

31. Mouth of Conodoguinet Cave

In Bates' History of Cumberland and Adams Counties, Pennsylvania, Vol. II, p. 6, 1886 is the following quotation from the History of Cumberland County by Rev. C. P. Wing published in 1879.

"Two or three caves have been discovered and entered, which have been esteemed as curiosities. The most wonderful of these is on the bank of the Conodoguinet, about a mile north of Carlisle. It is under a small limestone cliff, not more than 30 feet high above the surface of the creek; but through a semi-circular arched entrance, from 7 to 10 feet high, and 10 feet in width, it descends gradually to an anti-chamber of considerable size. From this a vaulted passage large enough to allow



32. Map of Conodoguinet Cave

one to walk erect extends 270 feet, to a point where it branches off in three directions. One on the right is somewhat difficult on account of the water which percolates through the rocks on every side, but leads to a large chamber of great length. The central one is narrow and crooked, and has never been completely explored on account of a deep perpendicular precipice which prevents all progress beyond about 30 feet. The other passage is smaller and has little interest.

"In different parts are pools of water, supposed by some to be springs, but as they have no outflow they are more probably formed from drippings from the surrounding rocks. Human bones have been found in

it, and no doubt it has been used as a place of refuge or temporary lodgment by the Indians. No such articles as are usually deposited with their dead have yet been discovered."

When this cave was visited in May 1930,the floor of the first room was covered with soft mud several inches thick, but beyond the first turn the floor was fairly dry. Although we followed each branch to its present end, we failed to find any large room, the whole cave being a crooked passageway mostly 10 to 15 feet wide. A map was made with plane table and pocket transit, the measurements being made with a 100-foot steel tape. The "deep perpendicular precipice" was not discovered. The distance from the entrance to the back of the cave in a straight line is 200 feet, and by the crooked passage 300 feet. The cave as mapped is all on one general level. It is in the Beekmantown limestone of Ordovician age which here strikes EW. and stands on edge. Sink holes in the immediate vicinity suggest that the cave may have greater extent, but doubt, however, should be placed in the story that a dog once entered this cave and came out near the Army Medical School which is a mile southeast and across the strike of the limestone beds.

The cave at Carlisle may well be called Conodoguinet for that Indian word is said to mean "for a long way nothing but bends," which is descriptive of the cave as well as the creek.

Mostly the walls of the cave are devoid of cave onyx. No stalactites were noticed but there is some massive drip stone. I would not consider this cave worth developing, but exploration of the neighborhood for as yet undiscovered caverns might be rewarded.

DELANEY CAVE

Seven miles south of Uniontown in Fayette County and 3 miles southeast of Fairchance on the west side of Chestnut Ridge near the head of Cave Hollow, is Delaney Cave. It has been described as having hugh rooms, with narrow connecting passages, and extending for such distances that hours of time and miles of walking are required to explore it.

In April 1930, we had an opportunity to visit it for the first time. Our route was from Uniontown east on the National Highway to the Summit Hotel on Chestnut Ridge, and then over a poor dirt road along the crest of the ridge to the south precisely 5 miles. Here we left the automobile and followed a woods road on foot out a spur to the west, a distance of over half a mile. This brought us to a saddle on the spur and a sign pointed to the cave, which is on the north slope, less than 100 yards from the road.

Two holes were seen, one just large enough for a man to wriggle through and the other so big that horses could enter it. In fact this cave is said to have been used many years ago by a band of robbers who secreted themselves and their steeds in this underground shelter.

Delaney Cave in common with Bear Cave is in the Loyalhanna or siliceous limestone, commonly called "blue stone," that outcrops for many miles along Chestnut Ridge and Laurel Hill. At the cave this limestone dips west at an angle of 15 , or more or less parallel with the face of the mountain. The limestone has a system of nearly vertical joints, some of which trend N 40-60 ° W, and others nearly at right angles to this course. The main passage is a solution channel along one of these NW joints and extends in a nearly direct course about

33. Entrance to Delaney Cave

430 feet from the surface to a room at least 75 feet in diameter. For much of the way this passage is 10 to 20 feet wide, but about 400 feet in or just before entering the large room it narrows to about 3 feet, and above one's head pinches to less than a foot. In places the floor of the passage is clear, but elsewhere is covered with loose rock, including an occasional block several feet in diameter.

The room measuring about 75 feet by 100 feet was formed apparently by solution along a bedding plane, subsequent dropping and removal of roof blocks and eventually the falling of larger blocks from the domed ceiling. These now cover part of the floor of the room. Behind these blocks small crevices and passages lead to greater depths. One to the right descends to a choked channel through which water

was flowing. To the left another tortuous passage leads to a dip slope room that seemed by comparison to be about 100 by 150 feet, but mostly not over 10 feet high. It is said that from the far side of this room one can proceed a long distance through passages and rooms, gradually descending toward the foot of the mountain. Some of the passages are marked with arrows pointing the way out.

Mr. R. E. Addis, the deputy forester, says that he has explored the cave, and that although stalactites and other forms of calcite deposit are lacking in the main passage, having been broken off and removed, they do occur in the more remote and difficultly accessible parts of the cave.

According to R. C. Bossart of West Penn Power Company, Pittsburgh, about 100 yards from the room where we stopped the passage enlarges about 10 times the size of the outer passage. The chained length of the cave is 2,000 feet, but the winding course makes the distance seem much longer.

The following description contained in the county history[1] was written by John A. Paxton of Philadelphia shortly after he explored this cave on September 11, 1816. With five other men, Paxton tried all passages, even those so small that they had to crawl or wriggle to get through. Of the last or farthest and largest room he wrote "This we found to be very spacious, being from 20 to 30 feet wide, from 30 to 80 feet from the floor to the roof, and 1,200 feet in length, with a stream sufficient to turn a grist-mill running its whole length." "We measured with a line the extreme distance we had been in, and found it to be three thousand six hundred feet, but we must have traveled altogether upwards of two miles."

The cave was named for Thomas Delaney who owned the land under which it lies. Other spellings are De Laney, Delany, Dulany. Bats are seen occasionally in the cave but this is the only form of animal life reported here. I believe this cave can be reached also by a foot path leading up the mountain from Fairchance and by a rough road from Elliottsville. As the cave is several miles from any human habitation and has not been commercialized, each visitor must provide his own light and other needs.

DREIBELBIS CAVE

On the Fred Dreibelbis farm in the northern end of Berks County, 3 miles north of Virginville, there is said to be a dry cave, the entrance to which is very small, and high on a sloping hillside. One description of it is that a man can enter only by letting his legs in first and then sliding down. The ceiling is said to be low. The cave is probably not over 200 feet in length and contains some cave formations.

[1] Ellis, Franklin, History of Fayette County, Pa., pp. 15-16, 1882.

Another statement is to the effect that there is one large cavern containing a hugh stalagmite about 5 tons in weight and resembling a dragon. This cave is commercially impractical because if its lack of height.

DURHAM CAVE

Durham Cave is located along Delaware River in Bucks County less than a mile south of the borough of Riegelsville. The entrance is from an abandoned limestone quarry west of the Lackawanna Trail, and a few hundred feet north of Durham Creek.

The earliest mention of Durham Cave is found on Schull's map of the province of Pennsylvania published in 1770, and thus makes this the first cave of which we have a printed record. The first written description appeared in 1828 in Hazards, "Register of Pennsylvania."*

The entrance to the cave then was only about 6 feet across and the interior consisted of three large rooms, each about 90 feet long, of varying width up to 40 feet, and 20 feet high. The total length of the cave at that time was 300 feet, the latter 20 feet of which was filled with water prohibiting further exploration. According to the late Dr. Henry C. Mercer in an article* entitled "An Exploration of Durham Cave, Bucks County, Pennsylvania, in 1893" the subterranean chamber had been reduced by quarrying operations to 175 feet, and since then it has been further reduced about 50 feet until now only part of the last large chamber remains.

An interesting collection of bones was made in this cave by H. D. Rogers, State Geologist, about 1856. Twenty different species of animals were found in this collection.[1]

Dr. Mercer investigated this cave in 1893 and reported[2] nearly two dozen additional animals, of which several are now extinct in this part of Pennsylvania and one, the peccary, is not known to have inhabited this region in historic time.

FRANKSTOWN CAVE

Frankstown is a hamlet in Blair County on U. S. route 22, 2 miles east of Hollidaysburg. Here the American Lime and Stone Company while quarrying limestone in a ridge a quarter of a mile west and 250 feet higher than the settlement came upon a cave in April 1907. In the dirt on the floor of the cave many fossil bones were found and upon notification of the discovery, Carnegie Museum of Pittsburgh sent Mr.

*Hazard, Samuel, The Register of Pennsylvania, vol. I, No. 9, p. 132, March 1, 1828.

*Mercer, Henry C., Researches upon the antiquity of man in the Delaware Valley and the Eastern United States, Univ. of Pennsylvania, Pubs., ser. Phil. Lit. and Arch., vol. VI, p. 149, 1897.

[1]Annual report of Geol. Surv. of Penn. for 1887, p. 18-19.

[2]Mercer, H. C., op. cit

O. A. Peterson of the Section of Paleontology to collect material as the cave was demolished. The result was a surprising array of bones.

In the Helderberg limestone which here dips SE 27° are joints enlarged by solution to holes big enough for a man to enter, and some small caves. The cave in which the bones were found was about 40 feet long, 7 feet wide, and up to 12 feet high. The floor, about 30 feet below the surface, was covered with two feet of red earth, mixed with organic material, fallen blocks of limestone, and cave onyx. In this earth is where the bones were found. At the surface there was no evidence of the cave beneath, but the face of the quarry when it cut through the cave showed the upper part of the cave filled with blocks of limestone cemented together with cave onyx. The hole through which the animals entered the cave must subsequently have become clogged and filled.

Many of the bones were broken by falling rock, and no articulated skeletons were found. Nevertheless it was possible to identify parts of the skeletons or teeth of birds, snakes, frogs, bats, wolves, bear, bison, small rodents, deer, musk-ox, peccary, tapir, sloth, and mastodon. Bones of one adult and five small mastodons were found in the upper part of the deposit, as if they had been the last to enter the cave. Snakes and frogs are always falling into holes, bats live in caves, and one can imagine a peccary falling in and a wolf going in after it, but it is hard to understand how six mastodons ever were so stupid as to be thus trapped.

Some of the animals are extinct species, and the association of tapir, peccary, and musk-ox suggests that these animals existed during one interglacial period, perhaps about the time of the disappearance of the American mastodon, and the appearance of the Artic fauna.

Some of the bones recovered are now on display in the Carnegie Museum, Pittsburgh, and the occurrence is described in the Annals.[1]

Mr. Silas Geesey of Frankstown who worked in the quarry for many years still had in April 1930 a fine specimen of mastodon tooth from this cave.

Continued quarry operations completely removed the walls of the cave. Its location is believed to have been not far from the east end of the upper quarry.

HARTMAN CAVE

Hartman cave is in southeastern Monroe County near the top of Godfrey Ridge a little more than a mile northeast of Stormville, and 2½ miles southwest of Stroudsburg. It is unique among the caves of

[1]Holland, W. J., A preliminary account of the Pleistocene fauna discovered in a cave opened at Frankstown, Pennsylvania, in April and May, 1907: Annals, Carnegie Museum, vol. IV, 1907, pp. 228-233.
Peterson, O. A., The fossils of the Frankstown Cave, Blair County, Pennsylvania: Annals, Carnegie Museum, vol. XVI, 1926, pp. 249-314.

Pennsylvania in that the opening lies along the crest of an anticlinal arch and extends through the Helderberg limestone inward for a distance of 225 feet, at which point the roof has fallen, prohibiting further passage except along a narrow sloping crevice for possibly 25 feet more. This cave is also known as Crystal Hill cave.

The cave runs in an EW direction and is perfectly straight with a nearly level floor. Its width averages throughout about 20 feet. The roof is the semi-circular crest of the anticline and in many places has spalled off along the bedding planes producing more or less of an onion effect when viewed from the side of the cave. The height of the roof at the entrance is 10 feet but farther in it is less than 6. The floor could readily be lowered however, as there is a deposit of clay upon it, which is said to be 10 feet thick in places.

The cave has no stalactites or stalagmites, but it is well worth a visit not only because of its unusual structural form, but also for the beautiful limestone bluff which forms the setting around the entrance.

The first recorded scientific exploration of this cave took place in 1880, when Dr. Porter, Prof. Leidy, and Mr. Paret collected numerous fossils and published their results in the "Annual Report of the Geological Survey of Pennsylvania for 1887."

The remains of two animals that are now extinct in Pennsylvania were found; namely, the caribou and the bison, together with two species of peccary and beaver that are now totally extinct.

Bones and teeth of the following 21 animals were also discovered: lynx, gray fox, wolf, skunk, weasel, raccoon, mole, dusky bat, little brown bat, woodchuck, porcupine, beaver, muskrat, gray squirrel, brown squirrel, meadow mouse, white-footed mouse, wood rat, gray rabbit, deer, and elk. Bones of the wild turkey, box turtle, snapping turtle, several snakes and a number of snail shells, as well as quite a collection of Indian weapons and utensils were also uncovered.

MAIDEN CREEK CAVE

In the bank of Maiden Creek ¾ of a mile northwest of Maiden Creek Station or Calcium post office, Berks County, in the face of an old quarry in the Beekmantown limestone is a very small cave. It is in the west bank of the creek just below the bridge and consists of a single small room reached through a small hole. It has no interest other than as a place for venturesome small boys to explore.

MAMMOTH SPRING CAVE

About 3½ miles about Reedsville, Mifflin County, a large tributary of Honey Creek comes in from the west. Following up this branch a quarter of a mile one finds this broad stream shut in by high banks and issuing full size from a hole under a limestone ledge at the head of

the draw. The hole is so large that cattle could enter. It is just in front of the farm house on the Alexander farm. A few rods underground the cavern is about 160 feet wide. The stream occupies the whole floor.

It was by exploring this underground river in 1926 that boys found the place now known as Alexander Caverns. This underground river emerging as Mammoth Spring is the stream on which the boat trip is made in Alexander Caverns.

MAPLETON

On the north bank of Juniata River, at the north end of the bridge at Mapleton Depot, Huntingdon County, the Tonoloway member of the Helderberg limestone is exposed in a sizable quarry owned by I. N. Swope. One of the blasts designed to bring down a considerable quantity of stone on the face of this quarry some years ago blew in, instead of out, and so disclosed a good-sized cave back of, and partly below the level of the present quarry floor. Although this cave had interesting possibilities and was directly on a main highway, the quarry operator was more interested in production of crushed limestone than in the commercilization of a cave, and so it has not been developed. Other blasts have broken the walls and roof of the cave, so that the part adjacent to the quarry is now filled with broken stone or has been removed by the quarry operations.

The following is quoted from an article "The Caves of Huntingdon County, Pa." by L. C. Morganroth.[1]

"The general direction of the cave is northeast and southwest. The tunnel into it is near one end, and the cave extends 1,500 feet southwest and probably 300 to 400 feet in the other direction. This latter portion has not yet been explored, as fallen rock and other debris have blocked it up. It cannot be very extensive, though, as the mountain terminates rather abruptly in this direction. The cave possesses some very beautiful and an unusually large number of stalactites and stalagmites. The owners of the quarry on the discovery of the cave took prompt measures to prevent vandals from destroying the formations.

"The formations here are excessively steep, almost vertical; the limestone is close upon 100 feet thick and is distinctly separated into beds of 10 or 12 different varieties. The cave occupied one of these beds and is about 12 feet wide. So regularly does it preserve this width and so straight is it that it gives one the impression of a tunnel."

[1]Morganroth, L. C., Eng. and Min. Jour., vol. 71, p. 664, May 25, 1901.

NAGINEY CAVE

When Edgar Allen Poe visited Central Pennsylvania in 1838 he was much impressed with the large cave on the Naginey farm near Milroy, in Mifflin County. In the later part of the 19th century the cave was visited by many people, particularly on Sunday during the summer; they came from near and far, from Lewistown and Altoona, and more than once the Altoona brass band made the underground chambers resound with stirring music.

This cave was about 2 miles east of Milroy where the great limestone quarry of the Bethlehem Mines Corporation is located. In quarrying this limestone by trainloads for flux to use in the steel industry, this once well known cave has been obliterated. Its position was about 300 yards west of the new crusher and washing plant.

The abundance of sink holes in the valley between Naginey and Reedsville indicates the soluble character of the underlying limestone and suggests the presence of other caverns as yet undiscovered.

NEEDY CAVE

In Franklin County at the northern end of a limestone ridge 2½ miles southeast of Waynesboro court house and in the bank of Red Falls Creek is a cave that was mentioned first by H. D. Rogers in his report of the Pennsylvania Gelogical Survey in 1858 as follows:

"On the Southern Branch of Antietam Creek, near the Maryland line, we encounter a band of white limestone at Royer's. ******* A

34. Mouth of Needy Cave

rather extensive cavern occurs in the limestone at the northeastern end of a ridge, a little lower down on the same branch of Antietam Creek. Still lower down the stream, at David Funk's, occurs a gray calcareous and siliceous rock, in thin layers, from which excellent flagstones are quarried.

This cave took its name from the Needy family which owned the land for several generations. It is now owned by John Downin, R. D. 4, Waynesboro, whose home is barely 50 feet from the entrance. The course of the ridge is S 20°W but the limestone at the entrance strikes S 50°W and dips SE 65°.

The hole in the hillside is only a few feet wide but it gives immediate access to a room about 20 by 50 feet, and 15 or more feet high which however, is devoid of any natural cave ornamentation. From the far side of this room a small passage leads to the right a few feet and down 3 or 4 feet more into another room about 15 feet wide and 30 feet long. This is the beginning of a long straight passage which pinches and swells and has a ceiling of varying height. Less than 200 feet from the entrance the floor is covered with water several inches deep, but one can get past by climbing up a few feet. In less than 50 feet further there is no footing and further progress could be made only by bridging the crevice and climbing higher, or by swimming along the crevice in water several feet deep. The spot where a plank has been thrown across, called "The Well," is 10 or 12 feet above the water which fills a gash 3 to 6 feet wide. The ceiling is 20 to 30 feet above and the walls are partly covered with drip stone. A beam of a flash light revealed water along the bottom of the crevice for 50 or more feet ahead. Boys are said to have crossed The Well and to have gone much farther underground, but nothing more than this was learned.

As the cave is only three-fourths mile from the Waynesboro-Emmitsburg highway and 3 miles from several popular summer resorts in South Mountain, it seems to the writer that anyone interested in developing a cave for commercial purposes would do well to explore this one thoroughly.

PORT KENNEDY CAVE

At Port Kennedy on Schuylkill River just below Valley Forge, Montgomery County, was a cave which is mentioned in geologic literature as a place of much interest because of the remains of extinct animals found in it. Cope[1], Mercer[2], Leidy[3], and others have described four species of giant sloth, two horses, a tapir, three peccaries, a mastodon, five cats, including two species of saber tooth, and a

[1]Cope, E. C., Proc. Amer. Philoph. Soc., vol. XII, p. 15, Feb. 3, 1871.
[2]Mercer, H. C., Proc. Acad. Nat'l. Sciences of Philadelphia, Oct. 29, 1895.
[3]Leidy, J., Annual Report of the Geol. Survey of Pennsylvania for 1887, pp. 1-20, 1889.

bear larger than a grizzly, in a total of fifty-four mammals, forty-one of which are now extinct.

The cave has been practically all quarried away and the little that remains has been filled with the waste lime sludge from the plant of the Ehret Magnesia Manufacturing Company.

REDINGTON

This cave, one of the largest undeveloped in our State, is situated at the far end of the abandoned limestone quarries of the Bethlehem Mines Corporation at Redington which is along the Lehigh River about 5 miles east of Bethlehem.

Part of the cave has been quarried away, and now the entrance is through a very narrow passage and down over a steep slippery talus slope of fallen blocks into a large room that is roughly circular in floor plan and measures about 50 feet in diameter. The height is about 40 feet. One long passageway extends up to the left for 250 feet in a straight line. The floor rises rapidly and the width decreases until finally there is just enough room for a small person to squeeze between three blocks and enter a low vaulted room. Exploration is possible from the opposite side of this little room, but it was too dangerous to attempt to explore without the use of a rope as descent must be made over an almost vertical slope.

Parallel to this channel and a few yards northeast of it is another crevice but this is only 2 feet wide and progress is soon blocked. A light will show that it continues on for a hundred feet or more.

This cave contains more formation than any of the other undeveloped caves and even excels several which are commercially exploited. The roof throughout practically its entire extent is covered with pencil-like stalactites, and in places it fairly bristles with these beautiful slender and hollow forms some of which are a foot long. A few larger stalactites were noticed and considerable clear white drip stone which at various places makes beautiful cascades. This white drip stone sometimes forms narrow ribbons, and except for the lack of banding it resembles the "bacon strips" of other caves.

Another interesting type of deposit is the arborescent calcite that is here better developed than at any of the other caves visited. These curious little aggregates of calcite crystals sometimes grow to be an inch high, and their overlapping branches and stubby base make one thing of a winter landscape of sleet-encrusted shrubs.

In the ceiling near the back and at the right side of the large room is a small crevice along a bedding plane and up about 15 feet from the floor is a layer of travertine that evidently at one time rested on clay filling but subsequently the clay has been removed and this

calcareous floor remains in testimony of the fact that water running in the rocks is as fickle as it is upon the surface.

The floor of the cavern is cluttered up with fallen blocks and sticky clay. However, this could easily be cleared out, and the entrance blasted larger to permit easier egress as now the inquisitive explorer must squeeze and slip down between two large rocks. The far end of the cave would also probably warrant exploration.

REESE CAVE

A cave at Dutchtown, 2 miles southwest of Fort Louden, Franklin County, was discovered in 1832 by a man named Reese in digging a well. At a depth of 20 feet below the surface the well broke into a cavern in which was a running stream. This stream has been the domestic water supply since that date, as is also the spring where it emerges close by.

The property is now known as the Shultz place and is owned by Frank Mellott. It is the southernmost house in the little settlement. The cave has been explored and some of the larger stalactites removed, but few people have entered it in recent decades because access is only by going down the well.

A low concrete dam in the cave covers the floor with several inches of water for a few yards and throughout most of the length of the cave some part of the floor is occupied by a stream. The course of the cave upstream from the well is crooked, but generally north for 200 feet, then northwest for 275 feet. A sharp bend in the passageway about 500 feet from the well is N 25° W from it. For 200 feet from the well there is plenty of room to walk upright and the gallery is 5 to 15 feet wide, but beyond this distance the roof is lower and travel beyond the cross gallery at about 350 feet is mostly on hands and knees. Here too, although at floor level the gallery may be 30 to 40 feet wide, at shoulder height it may be less than 5 feet wide.

In some parts of the cave the ceiling is covered with myriads of stalactites 1 to 3 inches long and less than a quarter of an inch in diameter. Each has a white tip bearing a drop of water. About 150 feet from the well a shelf of cave onyx projects 6 feet from the wall and supports a column several inches in diameter. At the next sharp bend the drip stone has built a series of small terraces, like a Philippine hillside with its rice paddies in miniature. Here on the one stretch of dry floor are built-up fringes of former pools.

At the junction of a cross passage is a natural bridge, and 500 feet from the well, where the underground stream enters the gallery, a passageway turns to the left but is so low that further progress was not attempted.

The gallery by the well appears to be along the strike, which is

N 5° E, but beyond the first bend the main gallery seems to be across the bedding, probably in part along a N W joint. The cross gallery is on the bedding but the strike here is N 40° E. Wide development at floor level far back in the cave must be along a horizontal joint.

The Reese cave has some interesting dripstone formations, but is hardly worth considering for development because of the wet floor, low roof, and one way passage. Sink holes back of the farm house indicate the presence of other caverns, and it is possible that a dry cave might be discovered here.

WILLIAMSON

At Williamson, Franklin County, three caves were seen by the writer and a fourth was reported. This last is said to be a vertical hole in the bank of Conococheague Creek opposite the Baker limestone quarry half a mile south of the village, to be reached only by ladder and to have water in the bottom. Also opposite the quarry, where a wire fence goes down the creek bank is an opening in steeply dipping limestone beds. The passageway is several feet wide and has a high ceiling, but the floor slopes down to creek level and there goes under water.

As this condition would seem to make the cave commercially impracticable, the writer did not explore it farther.

Less than a mile south of Williamson, on the Hykes farm, now owned by J. E. Baker of York and occupied by Sam Myers, are two caves. One is about 125 feet long, close under the surface, along the strike of steeply dipping beds, and entered where the roof has fallen in midway of the length. It is uninteresting.

The largest cave near Williamson is in the same field. The entrance is only 30 feet from the highway and a few rods north of the farm lane. The limestone beds strike N 55° E and dip SE 70°. At the surface the opening is only about two feet wide but the gallery widens under cover and the floor descends until the ceiling is 10 to 15 feet high. For 200 feet from the entrance the course is straight, then turns to the left abruptly and descends to another gallery which is about 400 feet long and very direct. In places the floor of this lower gallery is uneven, creviced, and progress along it requires care. On the right at least three passageways lead up slope to a parallel gallery that seems to be in line with the entrance gallery. Progress more than about 600 feet from the entrance is impeded by constriction of the gallery to openings too small for a man of average size to get through. It is possible that someone familiar with the cave may know a way to reach other galleries.

The cave is said to be visited annually by boys from Mercersburg Academy with a guide who knows all the galleries.

Stalactites are not notable, many having been broken off and carried

away. Drip stone on the walls is plentiful in some parts and its crystal faces sparkle with reflected light. Short, stocky columns were observed. Running water was not seen in the cave, and little water drips from the ceiling, but some of the flow stone is slippery with damp clay.

Development of this cave for commercial exhibition could be done rather easily, but the part seen by the writer has been despoiled of its best drip stone.

ORIGIN OF CAVES

Caves form more commonly in limestone than in any other kind of rock because limestone is more readily dissolved. Solution of limestone is accomplished by rain water which carries a little carbon dioxide picked up in passing through the air and soil. As the water circulates more freely along the bedding planes and joints in the rock it is there that solution progresses most rapidly, and where a joint and bedding plane meet a chamber may be formed.

A cave may be along one general level if it was developed close to a stationary water table, but many caves have several levels. Different levels may be produced by solution working along a more soluble bedding plane high above ground water, then down joints to a lower soluble bed; or after a general level has been developed at ground water level, a deepening of a near-by valley by normal erosion and lowering of the water table would permit developement of a lower level. Historic Indian and Seawra Caves are examples of different levels in steeply dipping beds brought about by lowering of water table.

The effect of abrasion by circulating water underground is very little in comparison with solution.

When a cave has been formed and solution has stopped because the circulating water occupies only the lower part of the cavity or has been diverted elsewhere, then deposition may begin. This deposition is by the evaporation of ground water slowly seeping into the cavern. When a drop of water dries on the ceiling it leaves a minute ring of lime marking the boundary of the drop. If water continues to seep and evaporate at the same place a hollow slender stone icicle or stalactite will be formed. Similarly the limy water that drops to the floor and evaporates there may leave a minute particle of lime. The accumulation on the floor usually spreads out and forms low domes or builds short chunky knobs. The forms built up from the floor are called stalagmites and the coating on the floor or nearly horizontal surface is sometimes called flow stone.

When a stalactite and the stalagmite beneath it unite a column is formed. In some caves all stages may be seen from the little spike on the ceiling and small knobs on the floor, through the various stages of nearing each other, to the completed column.

Stalactites often have a linear arrangement either along a joint in the

ceiling or along the edge of a dipping bed, because here water seeps most freely. Ground water dribbling down the walls of a cave may deposit a film or sheet of lime carbonate which as it thickens may assume many forms, often resembling a cascade.

All of this mineral deposit is calcium carbonate or lime, sometimes called cave onyx because some of it is banded. Pure lime so formed in a cave is white, but much of the ground water also carries a little iron and clay, which stains the lime. If these impurities are carried in fluctuating volume over a period of years the stalactites, stalagmites, and thin films will be white striped with brown. It is this variation in the quantity of impurity that gives the banding to the cave formation called bacon strip.

These thin narrow strips of cave onyx are formed where seepage along a joint is so abundant that the individual drops of water along the joint coalesce to form a continuous film. Probably a similar condition is the origin of the large curved or convoluted sheets or blankets seen in some caves. What makes them hang in folds I do not know, nor why some stalactites send out an upturned spur. The rare bridging and branching of stalactites seems to start on cobweb; but the idea that the phenomenon may be caused by a strong air current thwarting gravity by keeping the drop always on one side where precipitation takes place asymmetrically and a curved effect is the result, is subject to question.

FOSSILS

Caves large enough to give easy access to their bodies are used as shelter by wild beasts and thither they drag their prey. So bones of many types of animals are found in the clay and soil deposited on the floor of some caves. Being protected from the weather these accumulations endure for centuries. Man also has frequented some caves and left his trace in charred wood and bones, fragments of crude pottery, stone utensils, war implements, and so on. These relics of former life found in the floor of a cave are of deep interest to anthropologists, archaeologists and paleontologists for it is from such sources that the history of the earlier denisons of the region is learned.

According to the accounts herewith, human artifacts were found in Historic Indian cave and at Durham cave, and bones of many animals including some extinct mammals, were found in caves at Frankstown, Port Kennedy, and Carlisle; in Durham cave, and in Hartman cave. Human bones and teeth have been found in Historic Indian cave in Spruce Creek Valley and were reported in Conodoquinet cave. In the Port Kennedy cave bones of 34 species of mammals were found, and also of birds, reptiles, and amphibians. These species are mostly extinct now but their remains indicate the life immediately preceding the present era. All belong in the Quaternary period, and are of the Pleistocene age.

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